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A New Sequential Goodness of Fit Test for the Three-Parameter Gamma Distribution with Known Shape Based on Skewness and Kurtosis

THESIS

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Table of Contents

Page

Page

Page

Page

List of Figures

Figure		Page

Figure		Page

Figure		Page

List of Tables

Table		Page

Table		Page

Table		Page

Table		Page

Table		Page

Table		Page

Table		Page
G.48.	Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Gamma(1,1)	G-11
G.49.	Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Beta(2,3)	G-11
G.50.	Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Beta(2,2)	G-11
G.51.	Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: XCauchy(0,1)	G-11
G.52.	Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Lognormal(0,1) . . .	G-11
G.53.	Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: $\chi^2(1)$	G-12
G.54.	Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: $\chi^2(4)$	G-12
G.55.	Power Study: Kurtosis Test - H_0: Gamma(3.5); H_a: XLogistic(0,1)	G-12
G.56.	Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Xdouble -Exp.	G-12
H.1.	Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Normal(0,1)	H-1
H.2.	Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Weibull(2,1)	H-1
H.3.	Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Gamma(3.5,1)	H-1
H.4.	Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Lognorm(0,1)	H-2
H.5.	Power Study: Skewness Test - H_0: Gamma(1,1); H_a: XLogistic(0,1)	H-2
H.6.	Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Normal(0,1)	H-3
H.7.	Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Uniform(0,2)	H-3
H.8.	Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Gamma(3.5,1)	H-3
H.9.	Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Lognorm(0,1)	H-4
H.10.	Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: XLogistic(0,1)	H-4
H.11.	Power Study: Skewness Test - H_0: Gamma(3.5); H_a: Beta(2,3)	H-5
H.12.	Power Study: Skewness Test - H_0: Gamma(3.5); H_a: Gamma(1,1)	H-6
H.13.	Power Study: Skewness Test - H_0: Gamma(3.5); H_a: Gamma(2,1)	H-6
H.14.	Power Study: Kurtosis Test - H_0: Gamma(3.5); H_a: Beta(2,2)	H-7
H.15.	Power Study: Kurtosis Test - H_0: Gamma(3.5); H_a: Uniform(0,2)	H-7
H.16.	Power Study: Kurtosis Test - H_0: Gamma(3.5); H_a: Gamma(1,1)	H-8
H.17.	Power Study: Kurtosis Test - H_0: Gamma(3.5); H_a: Gamma(2,1)	H-8

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Abstract

This research presents a sequential goodness of fit test for the three-parameter gamma distribution with a known shape. The test is accomplished by employing the two new tests, sample skewness and sample kurtosis, sequentially as test statistics. Unlike the typical goodness of fits using parameter estimation methods such as MLE (maximum likelihood estimation) and MD (minimum distance estimation). This sequential goodness of fit tests using two test statistics above do not involve a substantial degree of computational complexity. Critical values are obtained using large Monte Carlo simulations, which use 'percentile' function, for shapes of 0.5(0.5)4.0 and sample sizes of 5(5)50. Attained significance levels for all combinations of the two tests between $\alpha = 0.01(0.01)0.20$ are also approximated with Monte Carlo simulations. Extensive power studies are then conducted against two sets of alternatives. One is against common alternative distributions and the other is comparative study whose competitor are popular EDF test statistics such as the Anderson-Darling, Cramér-von Mises, and Komogrov-Smirove tests.

The power of the sequential test for the comparative study demonstrated superiority over a broad range of alternatives. For the alternatives that greatly differ in shape, the power is outstanding, while the power for the alternatives that are not differing greatly in shape revealed lower power relatively. However, the powers itself for the sequential test are still acceptable. For small sample sizes, the achievement of the high power can be seen over a variety of alternative distributions considered. Tables of power comparison for individual test statistics are presented to help reader understand the behavior of the sequential test and to inform how to choose the significance level for each test efficiently. A directional variant of the sequential test is explored to show that, with the selection of an appropriate tail for each test, the power of the sequential test can improve.

A New Sequential Goodness of Fit Test for the Three-Parameter Gamma Distribution with Known Shape Based on Skewness and Kurtosis

I. INTRODUCTION

1.1 Background

Modern society has been developing new technology very rapidly. While this technology contributes to the improvement of the level of living, it also poses a threat to the well being of the human beings who use it. Therefore, studies striving to enhance human safety in the face of such threats have been carried out over scores of years. Even with all these efforts, recent tragedies associated with nuclear power plant operation such as Chernobyl, Russia in 1986 as well as the incident at Three Mile Island in Harrisburg, Pennsylvania in 1979, demonstrates the critical role reliability and maintainability (R & M) of such systems should play in our lives. As a result, major efforts to enhance the reliability of electronic components and maintainability of the systems have been initiated over the past decades. No doubt, such efforts will only grow in number and importance as time goes on. New approaches to component and system reliability will be required before the next generation of technology is produced. These approaches are certain to involve a breakdown of traditional barriers between reliability physicists, component designers, and production engineers.

Countless numbers of research projects have been undertaken involving thousands of engineers. Modern systems are, however, so complex that one cannot obtain the result one seeks by using a purely analytical approach. Therefore, many different approaches must be studied and employed to understand the operation of any exceedingly complex system. One important means is to employ a statistical model to investigate the failure rate of such systems or the components of any system during their operational life. Many statisticians have contributed to this field of study.

The gamma family of distributions is widely used and plays an important role in reliability study and life span analysis as Weibull, beta, exponential, and lognormal distributions do.

Analysts and statisticians are frequently confronted with the problem of assessing agreement between a theoretical probability model and empirical observations. Goodness of fit tests address this problem and are typically used to determine if a particular theoretical probability model is consistent with empirical observations. This is accomplished by computing a statistic, which is utilized to evaluate the differences between the sample and the hypothesized theoretical distribution. During evaluation if there seems to be a good fit between a histogram of the observed data and some hypothesized probability distribution, then the hypothesis that the data originate from a population characterized by this family of distribution is accepted.

There are four basic steps [4] that facilitate the development of a useful model leading to the application of a goodness of fit test. These are as follows:

1. Collect data on the real system being analyzed (*data collection*).
2. Identify or hypothesize a probability distribution or family of distributions to fit the data collected (*identifying the underlying statistical distribution*).
3. Estimate the parameters of the hypothesized probability distribution (*estimating the parameters*).
4. Conduct a goodness of fit test to determine whether or not the selected distribution and associated parameters chosen represent the data effectively and accurately (*testing for goodness of fit*).

There are several kinds of goodness of fit tests available which vary in power. In selecting a test, the analyst will usually opt for the one that provides him the highest power, defined to be the probability of correctly rejecting the null hypothesis when it is false [78: 455]. A test which has high power when any particular distribution is hypothesized to fit the data can properly discriminate

between that distribution and variable alternatives. Finding a test that can demonstrate the highest power to analyze any given set of data is the analyst's goal.

Several statisticians have studied and developed goodness of fit tests for the gamma distribution and many other different distributions. In general, for skewed distributions such as the gamma, Weibull, lognormal, and inverse Gaussian; Cohen and Whitten point out the important role these distributions play in the analysis of sample data originating from the study of life span, reaction time, reliability, survivor and related studies [14]. James [40] emphasized the flexibility of the gamma distribution to describe a mixture of chance and wear-out failure. Kapur and Lamberson [46], Law and Kelton [49], Scheaffer and Mcclave [67], Hogg and Ledolter [37], and Ireson [39], have listed some numerical examples and illustrated the appropriate use of the distribution in the areas mentioned above (e.g., time-to-failure distribution of electrical, mechanical, and electro-mechanical systems).

Recently, Viviano [77] and Özmen [76] presented a goodness of fit test for the gamma distribution. Viviano used Maximum Likelihood Estimation (MLE). Özmen uses both MLE and Minimum Distance Estimation (MD). Coppa [25] developed a goodness of fit test using 'Z' test statistic, based on the spacing between adjacent order statistics for the Weibull distribution. Crown [16] presented a new goodness of fit test for the Weibull distribution. In his research, he used minimum distance estimation to obtain a location parameter. Onen [57] conducted several modified goodness of fit test by applying Kolmogorov-Smirnov (K-S) and Kuipur empirical distribution function (EDF) statistics to the Cauchy distribution. Clough [12] developed a new sequential goodness of fit test for the Weibull distribution based on third moment (skewness) and forth moment (kurtosis). He proved that the moment-based sequential procedure provides a computationally simple means of testing for three-parameter known shape Weibull distributions and demonstrates notably higher power as compared to a variety of the more complex EDF tests commonly in use today.

This research will focus on developing a sequential goodness of fit test of the gamma distribution based on third and forth moment, skewness and kurtosis respectively. By employing Monte Carlo simulation and by making a study of its statistical power, Matlab software (statistical toolbox) will be utilized to generate critical values, obtain significance levels, and compute and document the power of each test.

1.2 Objective

The purpose of this research is to develop, implement, and analyze a new sequential moment-based goodness of fit test for the gamma distribution with unknown scale and location parameters but known shape parameter. The third and fourth standardized sample moments of the data will be utilized for this goodness of fit for the gamma distribution.

The sequential procedure (steps 1 and 2 can be interchanged) to be employed is as follows [12]:

1. Use the sample skewness for the first test.
2. Use the sample kurtosis for the second test.
3. If the sample chosen for the test passes both tests it is said to pass the sequential test.

The goal of the sequential test is to validate that the test is applicable to a broad range of alternate distributions and more powerful than those in use today.

II. LITERATURE REVIEW

The sequential goodness of fit tests for the three-parameter gamma distribution based on third and fourth moments is considered. A review for some subjects associated with this sequential goodness of fit test will be explored in this chapter. The reason of this review is to help readers understand the concept of the sequential test. The scope of this literature review is confined to the three-parameter gamma distribution, parameter estimation, skewness and kurtosis, and goodness of fit tests.

2.1 Gamma Distribution

The gamma distribution, also known as the Pearson Type III distribution, is skewed to the right and has been used extensively in reliability and life testing as well as in various other applications such as the time-to-failure distribution of electrical, mechanical, and electro-mechanical systems [42].

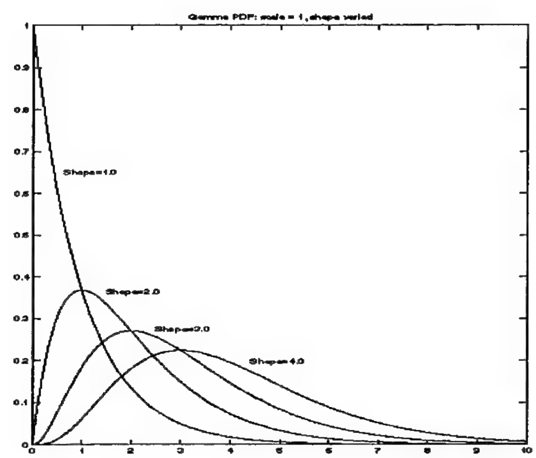


Figure 2.1 The Gamma PDF with $\beta = 1, 2, 3$, and 4, $\theta = 1$ and $\delta = 0$

2.1.1 Gamma Probability Density Function (PDF). In its most general form the gamma distribution has three parameters: a shape parameter β, a scale parameter θ, and a location

(threshold) parameter δ. Its probability density function is

$$f(x;\theta,\beta,\delta) = \frac{1}{\theta\Gamma(\beta)}\left(\frac{x-\delta}{\theta}\right)^{\beta-1} \exp\left[-\left(\frac{x-\delta}{\theta}\right)\right], \, x \geq \delta;\, \theta,\, \beta > 0. \tag{2.1}$$

The gamma distribution is a positively skewed distribution for small values of the shape parameter and it is close to symmetric for large values of the shape parameter. The expression $\Gamma(\beta)$ denotes the gamma function, defined as

$$\Gamma(\beta) = \int_0^\infty x^{\beta-1}e^{-x}\,dx.$$

Gamma density functions are drawn for integer and non-integer shape values as shown in Figures 2.1 and 2.2.

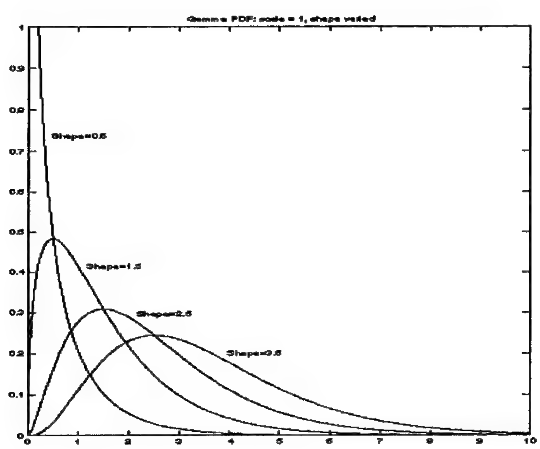


Figure 2.2 Gamma PDF with $\beta = 0.5, 1.5, 2, 5$, and 3.5, $\theta = 1$ and $\delta = 0$

2.1.2 Gamma Cumulative Distribution Function (CDF). The gamma cumulative distribution function is

$$F(x;\theta,\beta,\delta) = \int_\delta^x f(y)\,dy,\, x \geq \delta;\, \theta,\, \beta > 0. \tag{2.2}$$

2.1.3 Standard Gamma Distribution. Mathematically, there is no reason why the location parameter δ cannot be negative, but in most applications $\delta \geq 0$. If δ is known (or assumed) to be

zero, as is often the case, the three-parameter gamma distribution reduces to the two-parameter gamma distribution with PDF

$$g(x;\theta,\beta) = \frac{1}{\theta\Gamma(\beta)}\left(\frac{x}{\theta}\right)^{\beta-1}\exp\left[-\left(\frac{x}{\theta}\right)\right], x \geq 0;\, \theta,\, \beta > 0 \tag{2.3}$$

and CDF

$$G(x;\theta,\beta) = \int_0^x g(y)\,dy. \tag{2.4}$$

Note that the integral $\int_0^\infty x^{\beta-1}e^{-x}dx$ which defines $\Gamma(x)$ is convergent for every positive x but not convergent for any other real x. Thus, the CDF has no closed form solution other than every positive integer x [49: 332], but it can be evaluated with the aid of a table of the incomplete gamma function [59].

The *standard form* of the distribution is obtained by putting $\theta = 1$ and $\delta = 0$, giving

$$f(x;\beta) = \begin{cases} \frac{x^{\beta-1}e^{-x}}{\Gamma(\beta)} & x \geq 0;\, \beta > 0 \\ 0 & \text{otherwise} \end{cases}$$

2.1.4 Applications. The gamma distribution provides useful representations of many physical phenomena as the shape parameter changes. Special cases of the gamma distribution include the exponential, the Erlang, the chi-squared, and the normal distribution.

When $\beta = 1$, the PDF becomes the exponential PDF, often used to model component and system life and reliability [70]. The exponential distribution is characterized by a constant hazard rate, so the exponential model is appropriate when the hazard rate is independent of the age of the component or system. Moreover, Drenick [24] has pointed out that under some reasonably general conditions, the distribution of time between failures tends to the exponential as the complexity and the time of operation increase. However, there remain situations in which the exponential model is not realistic, and gamma models maybe be more appropriate. The lives of components and systems,

like human life, often have a bathtub-shaped hazard rate function with high infant mortality rate, first decreasing, then remaining constant or almost so during a long period of useful life, and finally increasing again with the onset of wear-out. The exponential distribution can be used to model only the central portion of the bathtub curve. The gamma distribution, however, can be used to model all three parts, since a decreasing, constant, and increasing hazard rate correspond to a shape parameter less than, equal to, or greater than one, respectively [34].

For the life of a device, T_D is the sum of the β life lengths, $T_1, T_2, \ldots, T_\beta$ of its component units. That is, $T_D = T_1 + \cdots + T_\beta$ is called the Erlang (β) distribution. Note that each component unit is exponentially distributed. The Erlang distribution (T_D) is a special case of gamma distributions when β is a positive integer. The PDF of the Erlang distribution is

$$f_{ER}(t;\beta,\theta) = \frac{t^{\beta-1}}{(\beta-1)!\theta^\beta}\exp(-t/\beta),\ 0 \le t < \infty,\ \beta \in \{1,2,3,\ldots\}$$

and the CDF is

$$\begin{aligned} F_{ER}(t;\beta,\theta) &= \frac{1}{(\beta-1)!\theta^\beta}\int_0^t x^{\beta-1}\exp(-x/\theta)\,dx \\ &= 1 - e^{t/\theta}\sum_{j=0}^{\beta-1}\frac{(t/\theta)^j}{j!},\ t > 0. \end{aligned}$$

Notice that the exponential PDF is a special case of the Erlang for $\beta = 1$.

The two-parameter gamma distribution with scale parameter $\theta = 2$ is a chi-squared distribution with 2β degrees of freedom. The chi-squared distribution is important because it is the basis for a number of procedures in statistical inference. The reason for this is that chi-squared distributions are intimately related to normal distributions [41: 172].

The gamma distribution is positively skewed for all finite values of the shape parameter, but as β increases, the shape of the curve becomes similar to the normal probability density curve.

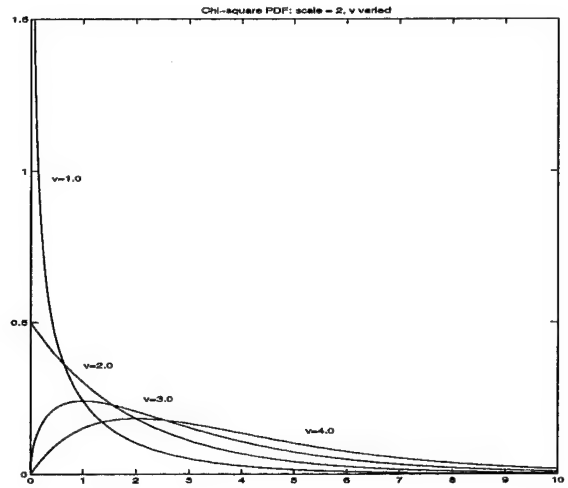


Figure 2.3 Graphs of χ^2 Distributions with $\nu = 2\beta$ ($\beta = 0.5, 1, 1.5$, and 2).

One of the most important characteristics of the gamma distribution is its "reproductive property": If X_1 and X_2 are independent random variables with gamma distributions $f(X_1;\beta_1,\theta)$ and $f(X_2;\beta_2,\theta)$, (X_1+X_2) also has a gamma distribution with parameters $(\beta_1+\beta_2)$ and θ. As the parameter $(\beta_1+\beta_2)$ increases, the shape of the distribution becomes similar to that of the normal distribution [64: 43].

2.2 Parameter Estimation

In the real world it is impossible to get true values for the parameters of the hypothesized distribution. There is no choice but to acquire parameter estimates from sample data. Parameter estimation is a discipline that provides tools for the efficient use of data in the estimation of constants appearing in mathematical models and for aiding in the modeling of phenomena [5] and fundamental steps in many goodness of fit techniques. Much research has been done in the areas of parameter estimation and there are a variety of methods. Maximum likelihood (ML), minimum distance (MD), method of moments (MOM), Bayes, least squares, and minimum chi-squared are more well known methods. Some of these methods will be reviewed briefly in this project [53: 73-288].

2.2.1 Maximum Likelihood Estimation (MLE). The method of ML is one of the most important general methods of estimation so far known. The method was known and used by Gauss

in his development of the theory of least squares, but the technique was not formalized until Fisher introduced it in 1912. Since then, the technique has undergone further development and has played a fundamental role in the theory of estimation with extensive use [23: 135]. The likelihood function tells us how likely the observed sample is as a function of the possible parameter values [41: 266].

For a random sample X from a gamma distribution with location parameter $\delta \geq 0$, scale parameter θ, and shape parameter β, which has PDF and CDF given by equations (2.1) and (2.2) respectively; the natural logarithm of the likelihood function of the $(m-r)$ order statistics $x_{r+1}, x_{r+2}, \ldots, x_m$ of a sample of size n is given by

$$\begin{aligned} L_{r+1,m} &= \ln n! - n\ln(n-m)! - \ln r! - n\ln\Gamma(\beta) - (m-r)\beta\ln\theta \\ &\quad + (\beta-1)\sum_{i=r+1}^{n}\ln(x_i-\delta) - \sum_{i=r+1}^{m}(x_i-\delta)/\theta \\ &\quad + (n-m)\ln\{\Gamma(\beta) - \Gamma[\beta;(x_m-\delta)/\theta]\} + r\ln\Gamma[\beta;(x_{r+1}-\delta)/\theta] \end{aligned} \tag{2.5}$$

where $\Gamma(\beta; z) = \int_0^z t^{\beta-1}\exp(-t)\,dt$ is the incomplete gamma function. The MLE's are obtained by equating to zero the partial derivatives of $L = L_{r+1,m}$ with respect to each of the three parameters, which are given by

$$\begin{aligned} \frac{\partial}{\partial\theta}L &= -(m-r)\beta/\theta + \sum_{i=r+1}^{n}(x_i-\delta)/\theta^2 \\ &\quad + (n-m)(x_m-\delta)^{\beta}\exp[-(x_m-\delta)/\theta]/\theta^{\beta+1}\{\Gamma(\beta) - \Gamma[\beta;(x_m-\delta)/\theta]\} \\ &\quad - r(x_{r+1}-\delta)^{\beta}\exp[-(x_{r+1}-\delta)/\theta]/\theta^{\beta+1}\Gamma[\beta;(x_{r+1}-\delta)/\theta] \end{aligned} \tag{2.6}$$

$$\begin{aligned} \frac{\partial}{\partial\beta}L &= -(m-r)\ln\theta + \sum_{i=r+1}^{n}\ln(x_i-\delta) - n\Gamma'(\beta)/\Gamma(\beta) \\ &\quad + (n-m)\{\Gamma'(\beta) - \Gamma'[\beta;(x_m-\delta)/\theta]\}\{\Gamma(\beta) - \Gamma[\beta;(x_m-\delta)/\theta]\} \\ &\quad + r\Gamma'[\beta;(x_{r+1}-\delta)/\theta]/\Gamma[\beta;(x_{r+1}-\delta)/\theta] \end{aligned} \tag{2.7}$$

$$\frac{\partial}{\partial\delta}L = (1-\beta)\sum_{i=r+1}^{m}(x_i-\delta)^{-1} + (m-r)/\theta$$

$$+ (n-m)(x_m - \delta) exp[-(x_m - \delta)/\theta]/\theta^\beta \{\Gamma(\beta) - \Gamma[\beta; (x_m - \delta)/\theta]\}$$

$$- r(x_{m+1} - \delta)^{\beta-1} \exp[-(x_{r+1} - \delta)/\theta]/\theta^\beta \Gamma[\beta; (x_{r+1} - \delta)/\theta] \quad (2.8)$$

where the primes in equation (2.7) indicate differentiation with respect to β [32].

The method of MLE has been applied to the problem of estimating the parameters of the gamma distribution by a large number of authors, including Fisher; Masuyama and Kuroiwa (1951); Des Raj (1953); Chapman (1956); Greenwood and Durand (1960); Wilk, Gnanadesikan and Huyett (1962); Mickey, Mundle, Walker and Glinski (1963); Harter and Moore (1965b, 1967b); Kappenman (1982); and Bowman and Shenton (1983).

Fisher showed that for estimating the parameters of a Pearson Type III postulation, except when it closely approximates normality, the method of moments is inefficient and he recommended use of the method of ML [27]. Harter and Moore [32] described an iterative method to obtain the MLEs of the parameters of the gamma population from complete and censored samples under the restriction that the location parameter is greater than or equal to zero. Later, Harter and Moore [33] gave the information matrix for doubly censored samples from the three-parameter gamma distribution, inverted it to obtain expressions for the asymptotic variances and covariances of $\widehat{\theta}$, $\widehat{\beta}$,and $\widehat{\delta}$, and tabulated the latter for $\beta = 1, 2, 3$ and sample proportions $q_1 = 0.00(0.05)0.25$ and $q_2 = 0.00(0.25)0.75$ censored on the left and on the right, respectively. Although iterative procedures are required to find the MLEs of the parameters of the gamma distribution in the general case, closed form expressions are available for estimation of the parameter of the one-parameter exponential distribution (the two-parameter gamma distribution with shape parameter $\beta = 1$). The ML estimator based on the first m order statistics of a sample size n was given by Epstein and Sobel as

$$\widehat{\theta}_{mn} = [x_1 + x_2 + \cdots + x_m + (n-m)x_m]/m$$

This estimator is identical to the best linear unbiased estimator given by Sarhan and Greenberg [48].

Johnnson and Kotz [43] point out the difficulty in finding the MLEs when β is near to one. They recommend the use of MLE when $\beta > 2.5$. Obviously when $\beta < 1$, the MLE for δ is the minimum ordered sample, $x_{(1)}$, and θ and β have no MLEs; the likelihood function goes to infinity as $x \to \delta$.

Woodruff and Moore [80: 113-120] used MLE for the location and scale parameters of the Weibull distribution. Viviano [77] presented a thesis on goodness of fit for the gamma distribution by using the MLE's of the location and scale parameters. Kappenman [45] developed a procedure that consists of computing the logarithm of the ratio of the maximized gamma likelihood function to the maximized Weibull likelihood function and selecting the gamma model, if and only if, the logarithm is positive. He obtained the maximized gamma likelihood function by replacing the parameters in the gamma likelihood function with their MLEs.

For the two-parameter gamma distribution, Bowman and Shenton [8] described a new algorithm for the evaluation of the MLEs of the gamma density. Recently, Rosaiah et al. [62] studied optimum class limits for MLE in a two-parameter gamma distribution from grouped data.

For three-parameter cases, Cohen and Whitten [13] presented an article modifying MLEs. Their approach is particularly successful for $1/4 \leq \beta < 1$, but becomes less effective for $\beta > 1$. In 1987, Bowman et al. [9] introduced a new algorithm that is concerned with the relationship between simulation and estimation problems and the three parameter gamma density. Recently, Hirose [35] developed a MLE scheme for the three-parameter gamma distribution using the reparametrized distribution function and the predictor-corrector method. He showed that using the reparametrized gamma distribution is superior to the original distribution itself in searching for local MLEs and that the predictor-corrector method can find all the critical points of the likelihood function in a certain parameter domain.

The excellent statistical properties of ML estimators make them a popular method of estimation. The properties are as follows [49] [1] [78]:

1. For most of the common distributions, the MLE is unique; that is, there exists only one value that maximizes the likelihood function.

2. For small sizes MLEs may be biased, however, they are in general asymptotically unbiased for large samples.

3. MLEs are asymptotically normally distributed.

4. MLEs have an invariance property that makes this method of estimation particularly attractive. If θ is the parameter associated with a distribution, we are sometimes interested in estimating some function of θ, say, $t(\theta)$, rather than θ itself. This $t(\theta)$ is a one-to-one function of θ, and if $\widehat{\theta}$ is the MLE for θ, then the MLE of $t(\theta)$ is given by

$$\widehat{t(\theta)} = t(\widehat{\theta})$$

5. MLEs are strongly consistent: that is, $\lim_{n\to\infty} \widehat{\theta} = \theta$.

6. If U is any sufficient statistic for the estimation of a parameter θ, including the sufficient statistic obtained from the optimal use of the factorization criterion, the ML estimator is always some function of U. That is, the MLE depends on the sample observations only through the value of a sufficient statistic.

2.2.2 Other Estimation Methods.

2.2.2.1 Minimum Distance Estimation (MD). A variety of parameter estimation methods have been introduced including the MLE. The MD minimizes the distance between the hypothesized CDF values of the sample data and the EDF. The CDF values come from a parameterized family of theoretical distribution functions. The distance between the CDF and EDF is measured by a goodness of fit test statistic. The parameter is adjusted until the distance reaches the minimum value. By iterations, the estimate of the parameters is finally obtained. Wolfowitz [79]

pioneered MD in the 1950's. He point out that the great usefulness of the minimum distance method is that in a broad variety of problems, it provides consistent estimators even when classical methods (e.g. ML) fail to give consistent estimators. A consistent estimator converges stochastically to its parameter value with probability one. The research on MD was expanded by other statisticians. Knusel [47] and Parr and Schucany [58] investigated MD estimation in relation to robustness. Knusel showed that MD has similar robust properties as the MLEs. "Robustness refers to an estimation procedure that is good for a broad class of underlying models, but which is not necessarily the best estimation procedure for any one model" [36: 237]. Parr's work on minimum distance and robust estimation gave Hobbs et al. [36] motivation for their research on MD estimation of the three parameters of the gamma distribution. Hobbs et al. combined the use of discriminants, ML, and MD techniques and especially gave attention to small sample sizes. Several new estimators were developed of which six incorporated MD estimation for determining the location parameter or guaranteed life with the remaining parameters estimated by ML. All the new estimators give better results than the MLE [36].

2.2.2.2 Method of Moment (MOM). Moment estimators proposed by Pearson, provide one of the oldest and simplest general methods of estimating parameters from a sample [15: 497-498].

> The method is based on the intuitive idea and assumption that sample moments should be good estimates of the corresponding population moments. Because of its simplicity, the method of moments is especially useful in situations where other estimators are bogged down by mathematical manipulative difficulties [26: 4].
>
> Method of moments is another procedure for providing an estimate of a parameter without requiring the a priori knowledge of its probability density function although, as in the case of maximum likelihood estimation, a conditional probability density on the observations is required. It yields an estimate, which is not necessarily optimal in any sense. Yet, the method is intuitively appealing due to its simplicity [56: 215-216].

The fact that the MOM does not possess desirable asymptotic properties like the MLE prevented widespread use of the method. Stacy and Mihram [74] derived parameter estimation techniques using moment estimator for the three-parameter generalization of the gamma distribution.

2.2.2.3 *Maximum Product of Spacings (MPS) Estimation.*

The method of ML is not always satisfactory estimates of parameter for certain three-parameter distributions where the density is positive only to the right of a shifted origin. MPS is especially suited to cases where one of the parameters is an unknown shifted origin [10]. For the three-parameter gamma, lognormal, and Weibull distributions, it is known that MLE can break down since the likelihood is unbounded and this can lead to inconsistent estimators. In particular, MPS estimation gives consistent estimators with asymptotic efficiency equal to MLEs when these exist. Moreover even in situations where MLE fails, it gives consistent, asymptotically efficient estimators.

2.2.2.4 *Bayesian Estimation.*

Bayesian estimators and ML were developed and compared for the three-parameter Weibull distribution [72]. They explored a number of alternative approaches to reduce the discrepancy between ML and Bayesian analysis. They found that the Bayesian approach showed the best solution for the original problem of inference about the endpoint of the distribution.

2.3 *Skewness and Kurtosis*

Two characteristics of distributions that play an important role in determining the shape of a probability density function are skewness and kurtosis. Skewness is a lack of symmetry in a probability distribution. In other words, if more of the probability density lies to one side of the PDF, it is considered skewed [12]. MacGillivray (1986) mentioned that the relative importance of the orderings and measures (of skewness) depends on circumstances, and it is unlikely that any one could be described as most important. Recently, Groeneveld studied an influence function approach to describing the skewness of a distribution. He suggested that

> positive skewness should be thought of vaguely as a location-free and scale-free deformation of the probability mass of a symmetric distribution. Mass at the right of the median is moved from the center to the right tail of the distribution and mass at the left of the median is moved from the left tail to the center (thus preserving scale) [29: 101].

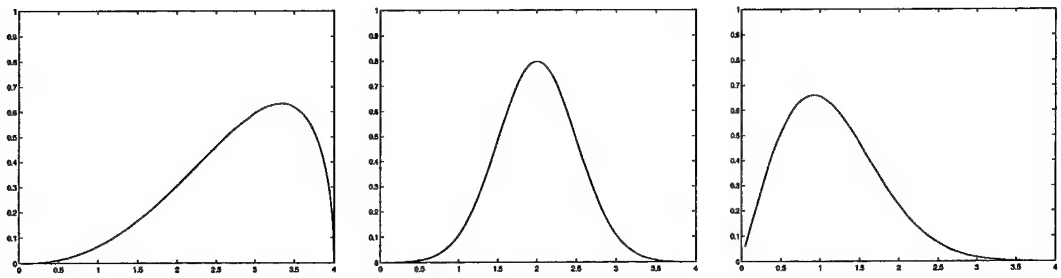
The concept of kurtosis can be found in statistics textbooks at all levels. The fundamental problem, as Bickel and Lehmann [2] noticed, is that there seems to be no universal agreement about the meaning and interpretation of kurtosis. An easy interpretation goes by a measure of dispersion around the two values $\mu \pm \sigma$. It is an inverse measure for the concentration in these two points. High kurtosis, therefore, may arise in two situations as follows [55]:

- concentration of probability mass near μ (corresponding to a peaked unimodal distribution)
- concentration of probability mass in the tails of the distribution

Balanda and MacGillivray [3] reviewed the development of the concept of kurtosis. Their conclusion is that it is best to define kurtosis vaguely as the location-free and scale-free movement of probability mass from the shoulders of a distribution into its center and tails and to recognize that it can be formalized in many ways. Also, many writers have sought a single interpretation of kurtosis, calling it either a measure of peakedness or of tail weight. Others have correctly interpreted kurtosis as measuring both of these activities [66]. Darlington [21] pointed out that kurtosis is best described not as a measure of peakedness versus flatness, as can be seen in most texts, but as a measure of unimodality versus bimodality. Chissom [11: 22] emphasized that much more weight must be placed on the tails of the distribution in the determination of the fourth moment. Johnson and Kotz [44] mentioned that kurtosis is a measure of deviation from normality depending on the relative frequency of values either near the mean or far from it to values and intermediate distance from the mean. A large number of alternate measures of kurtosis have been proposed. Many have been designed to measure only peakedness or only tail weight but they end up measuring both.

Let $f(x)$ be the density function of a random variable X which is said to be normally distributed

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{(-\frac{1}{2})(\frac{x-\mu}{\sigma})^2}, -\infty < x < +\infty, -\infty < \mu < +\infty, \sigma > 0$$



(a) Negative Skewed (b) No Skewed (c) Positive Skewed

Figure 2.4 Distributions Differing in Skewness

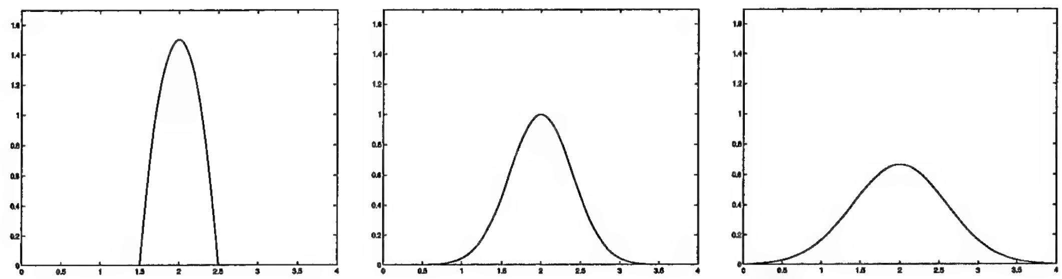
where μ and σ are the mean and standard deviation respectively. Then, the standardized third and fourth central moments are

$$\begin{aligned}
\sqrt{\beta_1} &= \frac{E(X-\mu)^3}{[E(X-\mu)^2]^{3/2}} \\
&= \frac{E(X-\mu)^3}{\sigma^3} \\
\beta_2 &= \frac{E(X-\mu)^4}{[E(X-\mu)^2]^2} \\
&= \frac{E(X-\mu)^4}{\sigma^4}
\end{aligned}$$

where E is the expected value operator and $\sqrt{\beta_1}$ and β_2 measure skewness and kurtosis respectively.

For the normal distribution skewness is zero and kurtosis is three. The nonnormality of a population can be described by $\sqrt{\beta_1}$ and β_2 values differing from the normal values. For example, $\sqrt{\beta_1} > 0$ corresponds to skewness to the right and $\sqrt{\beta_1} < 0$ corresponds to skewness to the left. Figure 2.4 represents distributions with various skewness values. In similar fashion for kurtosis, Figure 2.5 depicts a normal distribution and two nonnormal distributions; One is heavier but one is thicker than those of the normal ($\beta_2 > 3$). These distributions also tend to have higher peaks in the center of the distribution [18].

An enormous amount of effort has been devoted to studies for skewness and kurtosis. In 1965, the role of tests of normality in modern statistics was summarized by Shapiro and Wilk [68].



(a) Leptokurtic (b) Platykurtic (c) Mesokurtic

Figure 2.5 Distributions Differing in Kurtosis

Mardia [51] proposed measures of multivariate skewness and kurtosis by extending certain studies on robustness of the t statistic which involve measure of univariate skewness (β_1) and of univariate kurtosis (β_2). He found that Hottelling's T^2 is more sensitive to the measure of skewness than to the measure of kurtosis in the study for the effect of nonnormality on the size of the one-sample Hottelling's T^2 test. Bowman and Shenton [6] studied about skewness distribution in sampling the Pearson distribution. They showed that the skewness statistic should be quite useful in detecting discrepancies of Pearson Type I distributions from normality, and applied to the case with sample size $n \geq 75$. It is less successful for moderate to small samples in detecting discrepancies such as arise from distributions near, above and below, the Pearson Type III gamma line. Pearson and Hartley [7] used the sample skewness and kurtosis statistics separately to test the null hypothesis that the distribution sampled is normal. A critical study of the relative power of a variety of omnibus and directional tests of departure from normality for samples of 20, 50 and 100 is provided by D'Agostino and Pearson [19]. The skewness and kurtosis statistics are in general correlated. In other words, there will be situations in which $\sqrt{b_1}$ will dominate the test decision about normality with b_2 playing a minor role, and vice versa [20].

Royston [65] points out that there is substantial theoretical and practical drawbacks in assessing distribution shape with both the conventional measures for sample skewness and kurtosis [12]. Although there are some drawbacks with these statistics, D'Agostino et al. [18] showed that skew-

ness and kurtosis statistics, along with the D'Agostino-Pearson K^2 statistic that combines these two statistics, have been shown to provide powerful and informative tests. Unfortunately their use has not been as prevalent as their usefulness. Their recommendation is that for all sample sizes, skewness and kurtosis should be computed and examined as descriptive statistics. For all sample sizes $n \geq 9$, tests of hypotheses can be based on them. In particular, for $n > 50$, where the Shapiro-Wilk test is no longer available, these tests and the K^2 test are the tests of choice. The justification for this is not only because of their fine power but also because of the information they supply on nonnormality.

2.4 Goodness of fit tests

Statistical tests that determine how well a given sample of data agrees with a given distribution are simply called goodness of fit tests. In other words, the tests provide helpful guidance for evaluating the suitability of a potential probability model to be used [20: 1] [4: 375]. Graphical techniques can be used as well as most established tests (i.e. formal numerical techniques). Graphs can help reveal departures from the assumed statistical distributions and often uncover features of the data that were totally unanticipated prior to the analysis. The use of numerical techniques is often essential in order to avoid spurious conclusions that might have been brought about by the use of graphical techniques alone [20: 7]. In most applications of goodness of fit techniques, the null hypothesis (H_0) can be a simple hypothesis where $F(x)$ is specified completely, or it can be a composite hypothesis with an incomplete specification of $F(x)$. The alternative hypothesis (H_a) simply states that H_0 is false [20: 1].

The major focus is on the measure of agreement of the data with the null hypothesis, anticipating that H_0 is true. Brief procedures for a goodness of fit test are

1. Specify an hypothesized distribution.

2. Specify the parameters for the distribution (if the parameters of this distribution are unknown, as is usually the case, estimate parameters from the data).

3. Calculate the goodness of fit test statistics.

4. Determine the significance level.

5. Obtain the critical values for the significance level (Detailed procedures for obtaining critical values will be given in the following chapter).

6. Accept or reject H_0 by comparing the test statistic value obtained to the critical value [16: 2-4].

Two types of errors (Type I or α and Type II or β) can be encountered in reaching a decision about the null hypothesis.

- A Type I error occurs if H_o is rejected when H_o is true
- A Type II error occurs if H_o is accepted when H_o is false

Thus, α and β measure the risk associated with making an erroneous decision and provide practical measures of the efficiency of a test of hypothesis. The power of the test, denoted by $(1-\beta)$, is the probability of rejecting the null hypothesis when it is indeed false [25: 1-4]. We will consider power study further in the following chapter.

The study of goodness of fit tests has been developed by a large number of statisticians. D'Agostino and Stephen's "Goodness of Fit Techniques" [20] is a good reference that contains a comprehensive review. Chi-squared, EDF, and moment tests are reviewed briefly in the following sections.

2.4.1 Chi-squared Tests. The classical goodness of fit test, the chi-squared test first developed by Karl Pearson, is an almost universal test because of its broad applicability. It can be applied to discrete, continuous distributions, or mixed distributions; with grouped or ungrouped data; and with models completely specified or with the parameters estimated. It can also be

adapted to be used with censored data or truncated distributions [80: 113-120]. This test compares the histogram of the data to the shape of the candidate density or mass function [4: 375].

The test procedure is as follows:

1. Hypotheses :

H_0 : the random variable, X, conforms to the distributional assumption with the parameter(s) given by the parameter estimate(s)

H_a : the random variable X does not conform

2. Divide the n observations into a set of k class intervals or cells.

3. Calculate the test statistic.

$$\chi_0^2 = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i},$$

where E_i is the expected frequency of the class interval, which is computed as $E_i = np_i$, where p_i is the theoretical, hypothesized probability associated with the i^{th} class interval. O_i is the observed frequency in the i^{th} class interval. A usual rule is to choose the subsets so that the expected number of observations in each subset is greater than or equal to 5.

4. Accept or reject H_0 by comparing the test statistic to a critical value.

Normally, we reject H_0 if $\chi_0^2 > \chi_{k-p-1}^2$, where p is the number of parameters estimated in the specification of the null hypothesis [80].

In the chi-squared test, many statisticians have argued the art of grouping data. Fisher enabled use of the chi-squared critical values as a reasonable approximation for small sample sizes by proposing the rule that each expected cell frequency, E_i, should be at least five [61: 23]. Mann and Wald [50] elaborated on Fisher's rule by suggesting that class intervals that are equal in probability rather than equal in width of interval should be used if a continuous distribution assumption is

being tested. Furthermore, Rayner and Best [61], D.S. Moore [54], Roscoe and Byars [63], and Rao-Robson [60] suggested a variety of opinions about the number of cells, equiprobable cells, and the power of the test. Banks and Carson recommend not to use this test for a sample size less than 20 [4: 377]. Several authors have shown that chi-squared tests have lower power than other application tests since the data may be grouped differently, which may lead to a change in the reject or accept decision; hence, the test is not unique. EDF tests, such as the Kolmogorov-Sirmirnov, Cramér-Von Mises, and Anderson-Darling tests are well-suited to testing goodness of fit and are more robust for continuous data and small sample sizes. Their use, therefore, is encouraged [52].

2.4.2 EDF Tests. In addition to the basic chi-squared test mentioned in the previous section, there is a more general and popular class in the goodness of fit test field. EDF tests have been extensively studied by Stephens [20]. An EDF is a step function calculated from the sample data which estimates the population distribution function. EDF tests are based on the vertical difference between the EDF ($F_n(x)$) and the theoretical CDF ($F(x)$). The EDF for n ordered data points $x_{(1)}, x_{(2)}, x_{(3)}, \cdots, x_{(n)}$ is

$$F_n(x) = \frac{\text{number of observations} \leq x}{n}; -\infty < x < \infty.$$

More precisely

$$F_n(x) = \begin{cases} 0 & \text{if } x < X_{(1)} \\ \frac{i}{n} & \text{if } X_{(i)} \leq x < X_{(i+1)}, \text{ i} = 1, 2, \ldots, n-1 \\ 1 & \text{if } X_{(n)} \leq x \end{cases}$$

EDF statistics are divided into two classes, the supremum class, which includes statistics based on the largest vertical difference between $F_n(x)$ and $F(x)$, and the quadratic class, which integrated the squared difference between $F_n(x)$ and $F(x)$. In this research the popular and powerful

EDF test statistics, well-known as K-S[1], CvM[2], and A-D[3] test statistics will be utilized for the comparative power studies.

2.4.2.1 Kolmogorov-Smirnov Test Statistic. The K-S test statistic, denoted as D, is the most well known supremum statistic and is denoted as

$$
\begin{aligned}
D^+ &= \sup_x\{F_n(x) - F(x)\} \\
&= \max_i\{i/n - Z_i\}; 1 \leq i \leq n \\
D^- &= \sup_x\{F(x) - F_n(x)\} \\
&= \max_i\left\{Z_i - \left(\frac{i-1}{n}\right)\right\}; 1 \leq i \leq n \\
D &= \max(D^+, D^-) \\
&= \max_i(D^+, D^-),
\end{aligned}
$$

where $Z_i = F(x_i)$.

2.4.2.2 Cramér-von Mises Test Statistic. The CvM test statistic is a quadratic statistic. The CvM family is given by

$$Q = n\int_{-\infty}^{+\infty}\{F_n(x) - F(x)\}^2\Psi(x)\,dF(x), \tag{2.9}$$

where $\Psi(x)$ is a weighting function on the squared differences. When $\Psi(x) = 1$, the statistic is the CvM statistic which is denoted by W^2.

Stephens' computational formula is

$$W^2 = \sum_i\{Z_i - (2i-1)/(2n)\}^2 + 1/(12n).$$

[1]Kolmogorov-Smirnov
[2]Cramér-von Mises
[3]Anderson-Darling

2.4.2.3 Anderson-Darling Test Statistic. One of the more powerful EDF tests in a wide range of circumstance is the A-D statistic, denoted by A^2. It uses Equation 2.9 above with $\Psi(x) = \{F(x)\{1 - F(x)\}]^{-1}$ and Stephens' computational formula is

$$A^2 = -n - (1/n)\sum_i (2i-1)[\log Z_{(i)} + \log\{1 - Z_{(n+1-i)}\}]; 1 \le i \le n,$$

where $log(x)$ means log base e.

There are two categories of goodness of fit tests. A test where the hypothesized distribution is completely specified and a single table may be used for all continuous distributions for each test statistic. The second category is a test where the parameters are estimated, which is the most common case. The distribution of the EDF statistics depend on the sample size, the hypothesized distribution, and the method of the estimation used. Hence, a separate table of critical values must be obtained for each family and each set of estimators [80: 115].

One important characteristic of EDF tests is that when the unknown parameters are location or scale parameters that are estimated by appropriate methods, the distribution of the EDF statistics does not depend on the true values of the unknown parameters. However, when an unknown parameter is the shape parameter, the null distribution of the test statistic will depend on the true value of the shape parameter. D'Agostino and Stephens [20] provide principal references related to the tests along with tables of several EDF statistics such as A-D, CvM, U^2 (Watson statistic), and V (Kuiper statistic).

In the area of the EDF goodness of fit tests, asymptotic theory plays a major role in extracting percentage points in tables for testing since it is usually not possible to obtain an analytic expression of the test statistic distributions. Therefore, Monte Carlo methods are often used to obtain points for finite n. Fortunately, D'Agostino and Stephens [20: 102-103] found that for A-D, CvM, and U^2 statistics, percentage points of these statistics for finite n converge rapidly to the asymptotic points.

Conducting power studies over EDF test statistics is interesting and important for applications in the real world. Many statisticians have been involved in such studies.

> The overall result, when tests for normality or exponentiality are made with unknown parameters, is that A-D statistic is slightly better than CvM statistic for the alternatives discussed, with U^2 not far behind CvM statistic [20: 167].

Various power studies based on Monte Carlo sampling proved the superiority of the A-D statistic. For the most widely used EDF statistic, the K-S statistic turns out to be weak in power, while statistics $D^+$and D^- often have good power but each one against only certain classes of alternatives. In general, from the power studies, A-D (or CvM as second choice) should be the recommended omnibus test statistic for EDF tests with unknown parameters, with good power against a broad range of alternatives. Green and Heazy [28] built a table recommending which EDF test statistics to use when testing a particular distribution against several alternatives.

Woodruff et al. [81] modified a goodness of fit test for the gamma distribution with unknown location and scale parameters and known shape parameter. They presented the relation between the critical value and the inverse square of the shape parameter as

$$C = \alpha_0 + \alpha_1(1/\beta^2),$$

where C is the appropriate K-S, A-D, or CvM critical values, α_0 and α_1 are constants, and $1.5 \leq \beta \leq 4.0$. This relation holds reasonably well for all these test statistics. They also concluded that the modified CvM statistic is the most powerful of the three tests.

2.4.3 Moment Tests. Symmetric distributions are likely to produce samples with small skewness, while distributions corresponding to positive valued random variables are likely to produce samples with large skewness. In sampling from fairly symmetric distributions, one might expect the kurtosis to reflect the nonnormality. Thus, a combination of the test statistics $\sqrt{b_1}$ and b_2, might provide a more comprehensive test than either taken by itself [20]. Moment techniques,

especially using the standardized third and fourth sample moments as test statistics, have been studied by many statisticians. What makes these statistics more valuable, is that there is no need to estimate parameters. However, their use have been limited to tests for normality or departures from it.

Extensive studies investigating the statistical power of these tests over a wide range of alternative distributions have been undertaken. D'Agostino [17] and D'Agostino and Stephens [20] provide an extensive review of moment techniques for $\sqrt{b_1}$ and b_2. They demonstrated that $\sqrt{b_1}$ and b_2 have excellent properties for detecting nonnormality associated with skewness and nonnormal kurtosis, respectively. The statistics combining $\sqrt{b_1}$ and b_2 also have good power over a broad range of nonnormal distributions. The extensive power studies have also demonstrated convincingly that the chi-squared test and K-S test, have poor power properties and should not be used when testing for normality. Major statistical packages such as SAS and SPSSX perform the excellent Shapiro-Wilk W test for sample sizes up to 50. For larger samples, however, they supply the poor-power K-S. Unfortunately, hypothesis testing using the powerful $\sqrt{b_1}$ and b_2 is not presented or even suggested [18].

A comparative study of various tests for normality was conducted by Shapiro et al. [69] to provide general indication of the comparative effectiveness of the procedures. Those statistics used are W (Shapiro and Wilk), $\sqrt{b_1}$, b_2, K-S, CvM, WCvM (weighted CvM), D (modified K-S), chi-squared, and u (studentized range). As a result, they found that the $\sqrt{b_1}$ statistic is a good measure of nonnormality against highly skewed and also long-tailed distributions. However, it has low sensitivity against symmetric and asymmetric finite range distributions, while the performance of the b_2 statistic is good with finite range distributions, as well as with symmetric long-tailed infinite range distributions. It is not as effective, against skewed and discrete distributions. One of their conclusions was that the power of the W statistic is as good as the best of either $\sqrt{b_1}$ or b_2, but combining $\sqrt{b_1}$ and b_2 is regarded as a good competitor.

Later, D'Agostino and Pearson [19] provide directional tests, which may be appropriate to use prior knowledge suggests if a population is likely to be skewed in a specified direction. It is obviously true that $\sqrt{b_1}$ would be useful in a directional test for normality against skewed alternatives and b_2 would be against kurtosis alternatives. Nonnormal samples from asymmetric distributions will have skewness values different from zero, but may have similar weights in the tails to the normal distribution. On the other hand, nonnormal samples from symmetric unimodal distributions can be characterized by nonnormal kurtosis. Hence, $\sqrt{b_1}$ and b_2 should also be able to be usefully employed in harmony with one another as test statistics to discriminate between normal and a variety of nonnormal populations [20: 280] [12]. Mardia [51] developed measures of multivariate skewness and kurtosis by extending certain studies on robustness of the t statistic. Bowman and Sheton [7] developed omnibus test contours for departures from normality based on $\sqrt{b_1}$ and b_2. They used $X^2(\sqrt{b_1})+X^2(b_2)$ as test statistics and generated contour plots in the $(\sqrt{b_1}, b_2)$ plane for the test with numerous sample sizes and significance levels to facilitate its application. Hopkings et al. [38] also suggested that skewness and kurtosis are very useful tools for normality tests, but they are being ignored.

2.4.4 Sequential Tests. The phrase, sequential test, has not been used widely in the goodness of fit test field. Sequential testing employs existing tests in some predetermined sequence based on individual test results. A number of investigators have worked on sequential testing. A decision to accept or reject the null hypothesis may often be reached more quickly and effectively by using this sequential testing procedure. A sequential test involves a set of rules to be applied continuously over time. The tests will be continued until an acceptance or rejection step is reached as in a usual test. Similarly, in this thesis, the brief sequential procedure to be employed is as follows:

1. Perform a sample skewness test.

2. Perform a sample kurtosis test.

3. If both tests pass, it passes the sequential test.

The skewness and kurtosis tests may be conducted in any order. More detailed discussion will be given later.

Conducting a power study for the sequential tests is challenging. To employ sequential tests as omnibus tests, derivation of overall significance levels is necessary. This is because the test statistics to be utilized may not be independent. In our cases, the test statistics, skewness and kurtosis are in general correlated, although for normal sampling the correlation is zero, they are still dependent variables [20: 283].

Typically, one test in a sequential procedure is conducted at an α_1 level, and the other test at an α_2 level. The omnibus test rejects the null hypothesis if either test leads to rejection. The overall level of significance for these two tests combined is α, where $\alpha \leq \alpha_1 + \alpha_2$ by Bonferroni's inequality. Therefore the sequential test has significance level no larger than the sum of the two levels of the individual tests. The reason that one employs a sequential test is that the sequential test may be more powerful on average against a broader range of alternatives than either of the two separate tests. More specifically, if one combines a test that is powerful against symmetric alternatives but weak on skewed alternatives, with a test that is effective against skewed alternatives, the results may be a useful omnibus test that will yield better results against a wide spectrum of alternatives. The logic above is directly applied to this research. Sample skewness should work better in discerning deviations from the hypothesized distribution in terms of skewness, and sample kurtosis should be better in discriminating deviations in tail-weight or peakedness. Combing the two may prove to be a useful and fairly simple omnibus goodness of fit test for the gamma distribution [12].

One problem is to obtain an exact value for the attained significance level of this sequential test. The way to cope with this problem is provided through Monte Carlo simulation techniques, which makes possible numerous combinations of individual significance levels to get the desired overall significance. Monte Carlo procedures are employed not only to generate critical values for

a wide range of sample sizes and shape parameters, but to develop tables of empirically attained significance levels for this sequential test as well. It enables the reader to identify several levels in the given tables that would lie close to a desired value and then to choose which combination of α levels for the individual tests would be best for a particular situation.

A few examples of sequential tests are available in the literature. Onen [57] showed that the power of a sequential goodness of fit test for the Cauchy distribution using various combinations of EDF statistics against symmetric distributions, is always between the power of the two individual tests at identical α-levels. Gunes et al. [30] implemented and evaluated six sequential tests formed using selected pairs of standard EDF tests (KS-AD, KS-CvM, KS-U^2, AD-CvM, AD-V, AD-U^2) for the goodness of fit tests for the inverse Gaussian distribution. Their conclusion is that a sequential procedure using tests that are powerful at opposite levels of symmetry may offer a valuable option. Recently, Clough [12] presented a new moment-based sequential goodness of fit tests for the three-parameter Weibull distribution. He proved that the use of sequential tests has the potential of more robust performance against a wide range of alternative distributions by combining test statistics with complementary power characteristics.

2.5 Conclusion

The gamma distribution is used frequently and has been developed as a model for distributions of life spans, reliability, and various other applications such as the time-to-failure distribution of electrical, mechanical, and electro-mechanical systems. Several goodness of fit tests using well-known parameter estimation methods, have been conducted for the gamma distribution to evaluate the difference between a sample and a hypothesized theoretical distribution. Some popular parameter estimation methods are briefly reviewed in this chapter. As can be seen from the review, these parameter estimations (e.g. MLE and MD) involve very complicated computational procedures. This possibly brings about high cost in developing a simulation program and implementing the

program, which sometimes needs a tremendous amount of iteration for the computation. Nevertheless, with these parameter estimation methods, one can be bogged down by mathematical manipulative difficulties. Thus, several authors [26] [56] suggested using sample moments as test statistics, because of computational simplicity as well as not requiring a priori knowledge of its PDF. In addition, with the good property that sequential tests provide more power on average against a broader range of alternatives than either of the two separate tests, recent studies [57] [12] demonstrate the merit of sequential tests in the goodness of fit test field. Therefore, the sequential goodness of fit test for the gamma distribution based on the third and fourth sample moments will be an excellent competitor to other goodness of fit tests.

III. METHODOLOGY

3.1 Introduction

The first step in this research will be to estimate the sampling distribution of two test statistics for a particular test of hypothesis by means of Monte Carlo simulation methods. Next, the critical values for the test statistics at various significance level will be derived and tabled. Then, the overall significance level (attained significance level), which is the significant portion of sequential test, will be established.

The most critical procedure employed during such a sequential test is the determination of its power when subjected to a wide range of the sample data under several alternative hypotheses. The power of each test is the deciding factor. Ideally, this power will offer an improvement over that of existing tests such as the K-S, the CvM, and the A-D procedures. A flowchart for general procedures is given in Figure 3.1.

3.2 Critical Value Determination

3.2.1 Monte Carlo Methods. The Monte Carlo method is a numerical method of solving mathematical problems based on random sampling. There are two distinctive features of the method. First is the simple structure of the algorithm. Secondly, the error of calculations is proportional to $\sqrt{D/N}$ where D is a constant and N is the number of trials. Shooman [71] has stated that the error of a Monte Carlo simulation will be reduced proportionally to $1/\sqrt{N}$, where N is the number of trials in a perfect model with perfect random numbers. Therefore, as the number of observations increases, the accuracy one seeks will be approached. Modern simulation technology facilitates the generation of tens or hundreds of thousands of samples of a given sample size from any probability distribution [73]. Thus, Monte Carlo methods with the help of modern computing power are now widely used to support the conducting of goodness of fit tests.

The steps employed during a goodness of fit Monte Carlo simulation are as follows [12]:

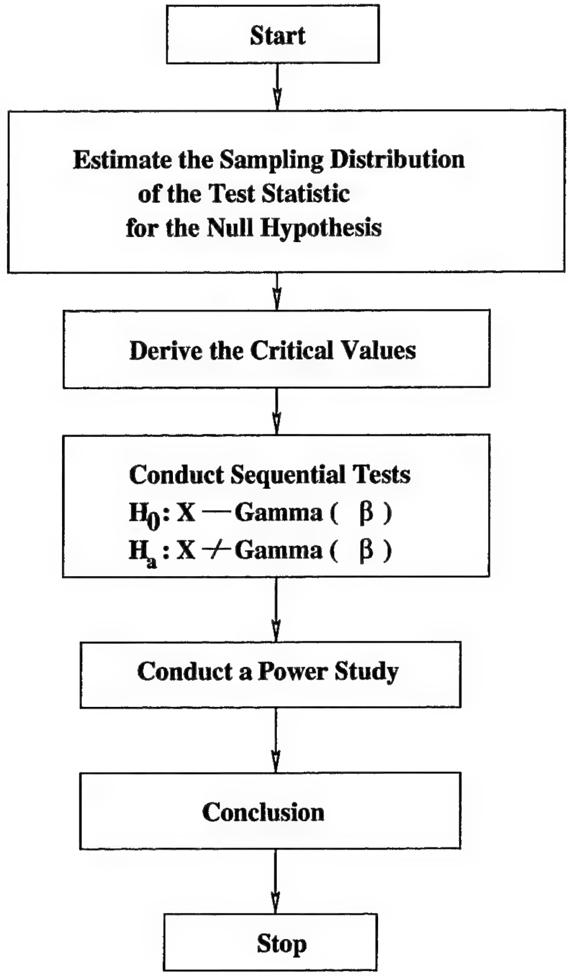


Figure 3.1 Flowchart for General Procedures

1. Random sample from a particular distribution is generated.
2. The sample is evaluated by some measure of interest.
3. This process is repeated for some predetermined number of samples or trials.
4. Performence measures are calculated and the approximate quality of the goodness of fit is determined.

In this thesis effort, since larger simulation runs will guarantee a better approximation of critical values for the test statistic being examined, 100,000 repetitions will be used to generate

the critical values for the test statistics, $\sqrt{b_1}$ and b_2, for a gamma distribution with known shape parameter.

3.2.2 Plotting Position. Often, plotting positions have been utilized to determine the critical values by employing linear interpolation to extract the desired critical value at a given significance level. Among the numerous plotting position approaches developed over the decades, the median plotting position is one of the most popular. Harter [31] notes that the differences in plotting positions become negligible as sample size increases beyond $N > 20$, but recommends the median plotting position. Since this research uses $N = 100{,}000$, we consider choice of plotting position irrelevant, however, for completeness, a comparison will now be given.

The computing formula for a critical value based on the median plotting position is as follows: Slope,

$$m = \frac{y_{i+1} - y_i}{x_{i+1} - x_i},$$

intercept,

$$b = y_i - mx_i,$$

and a critical value,

$$cv = \frac{(1-\alpha) - b}{m},$$

where y_{i+1} is upper and y_i is lower median rank that bound the value α, while x_{i+1} is upper and x_i is a lower skewness or a kurtosis sorted, m is slope determined by the values above, and cv and α correspond to a critical value and a significance level respectively. In more detail, suppose $\alpha = 0.005$ and a number of trials is 100,000 as used in this thesis. Then,

$$m = 0.00001/(x_{i+1} - x_i)$$

$$b = 0.994993 - \frac{0.0001}{(x_{i+1} - x_i)} x_i$$

$$cv = (0.995 - b)/m = 0.000007/m + x_i = 0.7x_{i+1} + 0.3x_i$$

That is, a critical value is determined by 70% weights for upper skewness or kurtosis whereas it is determined by only 30% weights for lower values. The Figure 3.2 illustrates the formula above.

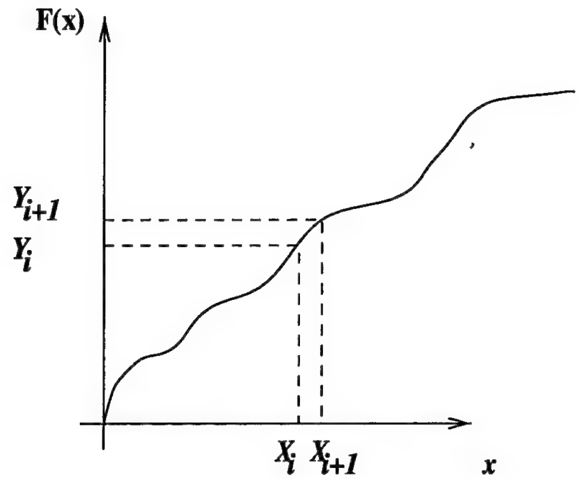


Figure 3.2 The Median-Plotting Position

A *MATLAB* function, 'prctile', gives the percentiles of the skewness or kurtosis sorted values. For instance, let p be a number between 0 and 1.

$$p = F(\eta(p)) = \int_{-\infty}^{\eta(p)} f(y)\,dy$$

where $\eta(p)$ is $(100p)^{th}$ percentile of the distribution of a continuous random variable X [41]. The plot 3.3 for $(100p)^{th}$ percentile of continuous distribution illustrates the definition above. $y =$ prctile(x, $100p$) returns a value that is greater than $100p$ percent of the values in x in *MATLAB*[1]. For example, if $p = 0.5$, y is the median of x. By using a large sample, the gap between percentiles will be reduced enough. To check the above assumption, 10,000 samples were run by both methods and results were compared with each other. The result turned out to be significant by only three decimal places with just 10,000 samples. The validation for codes of a critical value generation

[1] Matlab Programming Language

using the 'prctile' function, is given in the following chapter. Hence, as mentioned earlier, resorting to median plotting position is not necessary. Since using percentile function with a large simulated sample of data ($100K$), provides more computational efficiency. Thus, 'prctile' built in *MATLAB* will be used in this thesis.

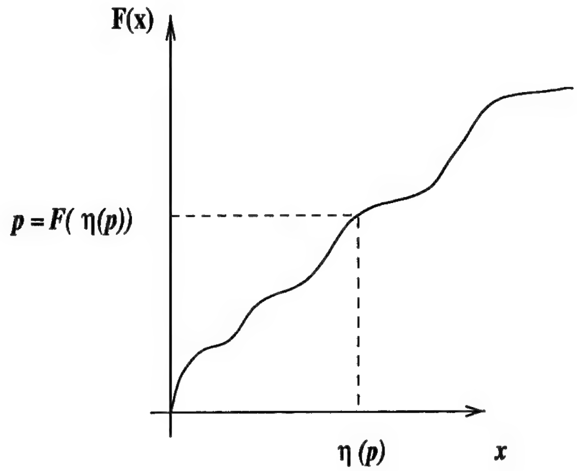


Figure 3.3 The $(100p)^{th}$ Percentile of a Continuous Distribution

3.2.3 Calculation of Critical Values. The specific procedures used to generate the critical value tables for the two test statistics utilized in this sequential test are presented below [12]. A flowchart of these procedures appears in Figure 3.4.

1. For each value of the gamma shape parameter $\beta = 0.5(0.5)4$, and for sample sizes $n = 10(5)50$, a sample of size n from the gamma$(\beta, 1, 0)$ distribution is generated. The values for the location and scale parameters are chosen for convenience since the test statistics, $\sqrt{b_1}$ and b_2, are location and scale invariant. Hence, the critical values generated from this particular distribution can be used for any location and scale.

2. Calculate the sample skewness and sample kurtosis for the sample generated.

3. Repeat the above two steps $100,000$ times to generate a sample of $N = 100,000$ values for each of the test statistics.

4. Sort each of the statistics in an array.

5. Calculate the (lower tail) and $\alpha = 0.80(0.01)0.90$ and $0.90(0.005)0.995$ (upper tail). The rationale for the fine granularity in the significance levels will become apparent shortly. The result at this point will be a table of critical values at the significance level for the specified gamma shape parameters and sample sizes above.

6. Increment the sample size and repeat the process for $n = 10(5)50$.

7. Increment the gamma shape parameter and repeat the process for $\beta = 0.5(0.5)4$.

3.2.4 Implementation of Critical Value Determination. This research will require a large amount of computer resources and simulation time. To implement the procedure described above, *MATLAB* will be utilized. The benefits provided by *MATLAB* are that the 'gamrnd' function in the Matlab Statistics Toolbox will generate the gamma random deviates very efficiently and the powerful matrix capabilities in *MATLAB* make it easy to handle big data arrays. The code for this procedure can be found in Appendix I.1. The critical values produced using this procedure are listed in Appendix A.

3.3 The Formal Statement of the Tests

The sequential test is conducted by combining the skewness and kurtosis test in any order. This test should be performed under the given attained significance level of α. A significance level is selected for each individual test in such a way that the combination of the individual tests yield the required attained significance level. The attained significance level to be achieved is determined by the user. A formal statement of the sequential goodness of fit test is as follows:

The hypotheses and test statistics, assuming a random sample $X_1, X_2, \ldots, X_n$ are given respectively by

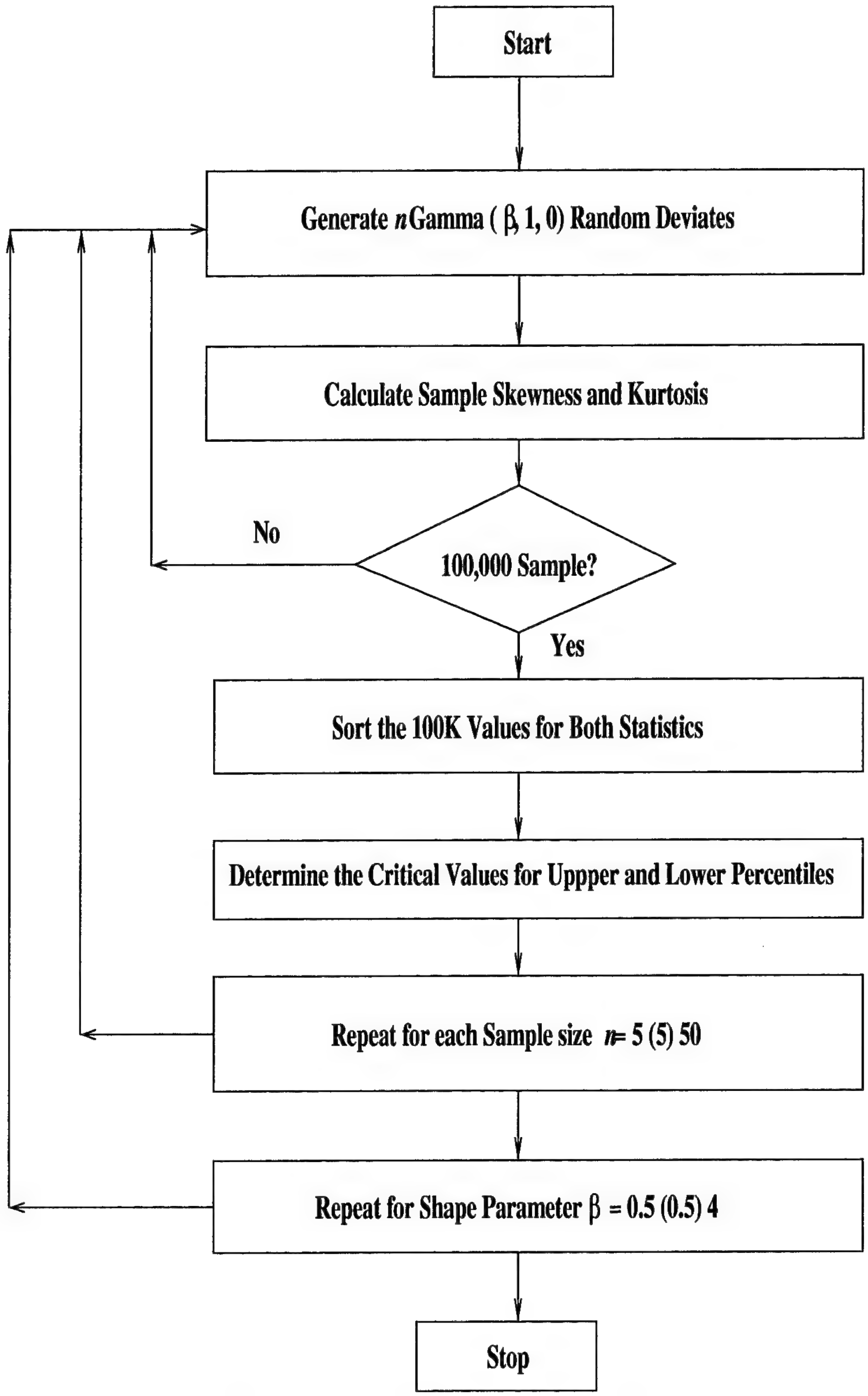


Figure 3.4 Flowchart for Critical Values

$$H_0 \quad : \quad X \sim \text{Gamma}(\beta)$$

$$H_a \quad : \quad X \not\sim \text{Gamma}(\beta)$$

and

$$\text{Skewness, } \sqrt{b_1} = \frac{\frac{1}{n}\sum_{i=1}^{n}(X_i - \overline{X})^3}{[\frac{1}{n}\sum_{i=1}^{n}(X_i - \overline{X})^2]^{\frac{3}{2}}}$$

$$\text{Kurtosis, } b_2 = \frac{\frac{1}{n}\sum_{i=1}^{n}(X_i - \overline{X})^4}{[\frac{1}{n}\sum_{i=1}^{n}(X_i - \overline{X})^2]^2}$$

For an overall significance level α, the rejection region is given by

$$\sqrt{b_1} > \sqrt{b_{1(1-\frac{\alpha_1}{2})}} \text{ or } \sqrt{b_1} < \sqrt{b_{1(\frac{\alpha_1}{2})}}$$

or

$$b_2 > b_{2(1-\frac{\alpha_2}{2})}, \text{ or } b_2 < b_{2(\frac{\alpha_2}{2})}$$

where α_1 and α_2 are the selected significance levels of the individual tests. Overall significance level, $\alpha \leq \alpha_1 + \alpha_2$.

3.4 Attained Significance Levels

3.4.1 Background. The critical value tables constructed in the previous simulation will be utilized to determine the attained significance levels. The procedure is similar to that used in the determination of critical values. If the sample of gamma deviates generated by Monte Carlo simulation fails one of the two tests, it fails the overall test. It allows attained significance levels for the sequential test to be evaluated by counting the number of samples that fail at each combination of levels. More specifically, the attained significance level (α) is simply the probability of rejecting a

true null hypothesis. The samples generated by this procedure are guaranteed to be gamma samples because they are generated by a gamma random deviate generator and are also independent. Hence, the attained significance level, α, can be found by calculating the percentage of all samples that are rejected at a given combination of levels α_1 and α_2. It should be noted that the attained significance levels will have to be considered for each sample size and shape combination since we are concerned with cases of known shape and various sample sizes.

During the research, Clough [12] found an erroneous portion from the code developed previously. He completed the effort to obtain the attained significance level correctly by slightly modifying the previous code that performed each test at all 20 α-levels regardless of whether a failure point was reached. Moreover, he introduced a simplified coding logic in modifying the code. The complexity of the test is vastly reduced by the very logic used for determining attained significance levels. There are two ways this simplification can be brought about:

1. If a given sample fails any hypothesis test at a level α, then it will fail the test at any higher significance level.
2. The sample fails once it fails just one of the member tests in the sequential test.

From the above facts, a simplifying logic can more specifically be established as follows. Once a sample fails at a given level for the first test, it will fail for every other higher α-level for that test, and the results from the second test are irrelevant - the sample has still failed the overall test. So, once a failure levels is determined for one test, one may conclude that the sample will fail for all remaining higher α-levels for the given test and all levels of the other tests.

As mentioned above, the attained significance level is the probability of rejecting a true null hypothesis. Thus, the crucial point of the code to obtain the attained significance level is to count the number of rejections of the true null hypothesis at a given combination of α-levels. To show how the code works for each test, tables are presented which exhibit four possible outcomes to the application of the sequential test at all combinations of significance levels for the two tests. For the

purpose of illustration, the tables below reflect the results of two tests over a range of each α-level between 0.01 and 0.05. Notice that a single sample in the counter array A was used, where A_{ij} represents the number of samples that failed the first test or the second test. Note also that a "0" indicates passing the sequential test and a "1" represents failing. The four outcomes are as follows:

1. There are no elements in the array A, which means the sample could pass both tests at all levels (Outcome I).

2. The sample passes Test #2 at all levels and it fails Test #1 at some level, say $\alpha_1 = 0.03$. Then, by simplifying logic, the sample fails the sequential test at levels for $\alpha_1 \geq 0.03$ across all levels of α_2 (Table 3.1) (Outcome II).

Table 3.1 Reject-Accept Table for a Single Sample

Test #1	Test #2 α_2				
α_1	0.01	0.02	0.03	0.04	0.05
0.01	0	0	0	0	0
0.02	0	0	0	0	0
0.03	1	1	1	1	1
0.04	1	1	1	1	1
0.05	1	1	1	1	1

3. Similarly, the sample passes Test #1 at all levels and it fails Test #2 at some level, say $\alpha_2 = 0.02$. Then, by simplifying logic, the sample fails the sequential test at levels for $\alpha_2 \geq 0.02$ across all levels of α_1 (Table 3.2)(Outcome III).

Table 3.2 Reject-Accept Table for a Single Sample

Test #1	Test #2 α_2				
α_1	0.01	0.02	0.03	0.04	0.05
0.01	0	1	1	1	1
0.02	0	1	1	1	1
0.03	0	1	1	1	1
0.04	0	1	1	1	1
0.05	0	1	1	1	1

4. Finally, the sample fails both tests at some level. This is shown in Table 3.3. The given sample fails Test #1 at $\alpha_1 = 0.03$ and fails Test #2 at $\alpha_2 = 0.04$ (Outcome IV).

Table 3.3 Reject-Accept Table for a Single Sample

Test #1	Test #2 α_2				
α_1	0.01	0.02	0.03	0.04	0.05
0.01	0	0	0	1	1
0.02	0	0	0	1	1
0.03	1	1	1	1	1
0.04	1	1	1	1	1
0.05	1	1	1	1	1

In the process of determining an attained significance level, one thing to be pointed is that, once the failure points for a single test have been counted for each test, the counter array, A, is modified by adding the results into the previous results. Through 100,000 repetitions for each sample size given, the array A is completed. Then, the attained significance level is determined by dividing A_{ij} by the total number of samples, $\alpha_{ij} = A_{ij}/100,000$, which represent the percentage of all samples that are rejected at a given combination of levels α_1 and α_2.

3.4.2 Implementation of Attained Significance Levels. The following outlines an algorithmic approach to achieve the attained significance level [12]. A flowchart in Figure 3.5 lays this out graphically. The results of these attained significance level calculations are presented in Appendix B.

1. Generate n gamma $(\beta, 1, 0)$ random deviates.
2. Load the critical values found in previous simulation.
3. Calculate the test statistics for the sample.
4. Initialize counters to track the current levels of the two tests; i_{curr} for Test #1 and j_{curr} for Test #2. In the coding scheme, the starting value of both i_{curr} and j_{curr} are 1 and both i_{stop} and j_{stop} are 21, where i_{stop} and j_{stop} are integers that represent the level of the first failure for each test. Each significance level (α_1, α_2) is obtained by computing $\frac{i_{curr}}{100}$, $\frac{j_{curr}}{100}$, respectively.

5. Conduct the first test. If the sample fails the test at this level, record the current level in i_{stop}. Then proceed to Step (7).

6. If the sample passes at the current level, increment i_{curr} by 1. If the range of desired levels has been tested ($i_{curr} > 20$) then leave $i_{stop} = 21$, indicating no failures, and proceed to Step (7). Otherwise, return to Step (5) with the new value for i_{curr}.

7. Conduct the second test. If the sample fails the test at this level, record the current level in j_{stop}. Then proceed to Step (8).

8. If the sample passes at the current level, increment j_{curr} by 1. If the range of desired levels has been tested ($j_{curr} > 20$) then leave $j_{stop} = 21$, indicating no failures, and proceed to Step (9). Otherwise, return to Step (7) with the new value for j_{curr}.

9. Now that the failure points have been determined from the steps above, increment the appropriate counters in the array A; increment A_{ij} for all (i, j) such that $i \geq i_{stop}$ or $j \geq j_{stop}$, avoiding duplication in the intersection of the two sets, which is executed by Inc = Faill | Fail2 and A(:, :, $n/5$) = A(:, :, $n/5$) + Inc, where Faill (Fail2) is an array of 0s and 1s indicating at what levels the sample failed test #1 (#2). The Inc array is the union of the two and will be used to increment the main count array A. A detailed code for this attained significance level can be found in Appendix I.1.

10. Repeat steps (1) through (9) for 100,000 samples

11. Repeat steps (1) through (9) for every sample size (n) selected.

12. Finally, As a result from all steps above. A_{ij} has the counts for the number of rejections of a true null hypothesis for the corresponding combinations of significance levels $\alpha_1 = \frac{i}{100}$ and $\alpha_2 = \frac{j}{100}$. Calculate α-level, $\alpha_{ij} = A_{ij}/100,000$, to find the attained significance level for a given combination, α_{ij}.

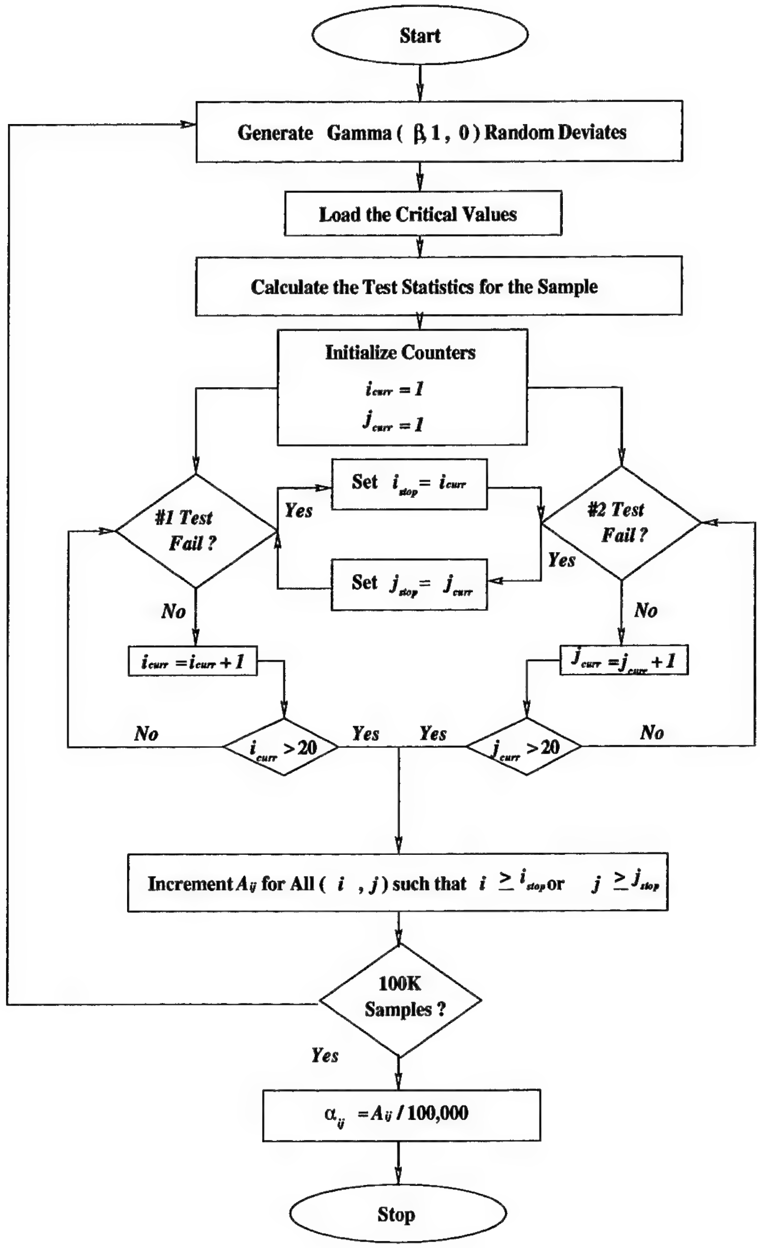


Figure 3.5 Flowchart for Attained Significance Levels Procedure

3.5 Power Study

3.5.1 Background. The significance levels give the probability of rejecting the null hypothesis when it is true. One would like to reduce the probability of rejecting the null hypothesis when it is true. In other words, one would like to increase the probability of rejecting H_0 properly when, in reality, it is not true. It is common to survey and compare the powers of several tests against a variety of statistical distributions to determine the usefulness of a given test. In this research, two set of power studies were conducted . One of them was devoted to such a **comparative analyses.** A previous gamma power study using EDF statistics, CvM, A-D, and K-S EDF test statistics developed by Woodruff et al. [81] was utilized. Whenever this sequential test demonstrates it has equivalent or better power against alternative distributions selected for the comparative power study it suggests that this sequential test is powerful enough to be utilized in the goodness of fit test field. Another set of power studies, common alternatives, allow some **direct comparisons** with the powers of tests for the gamma distribution with known shape found in the literature. The next section specifically discusses several of these alternative distributions which be used for power study.

3.5.2 Alternative Distributions.

3.5.2.1 Common Alternatives. These particular distributions for direct comparison have commonly been used in power studies. Since the logistic, Cauchy, double exponential, and normal alternatives are defined over the entire real line but the gamma distribution is defined on the positive half, the random variates of these distributions were converted to the positive real line by exponential transformation. The associated null hypothesis and alternative distributions are shown in Table 3.4.

3.5.2.2 Woodruff Alternatives. Woodruff et al. selected 10 alternative distributions and obtained EDF test statistics (K-S, A-D, and CvM) for those alternative distributions. Alter-

Table 3.4 Common Alternatives for Direct Power Study

H_0	H_a
$\beta = 0.5$	$\chi^2(1)$ XLogistic Xdouble-Exp. XCauchy
$\beta = 1$	Beta (2,2) Beta (2,3) Gamma (1,1) Gamma (2,1) Gamma (3.5,1) Normal (0,1) Uniform (0,2) Weibull (2,1) $\chi^2(1)$ $\chi^2(4)$ Lognormal (0,1) XLogistic (0,1) Xdouble-Exp. XCauchy
$\beta = 1.5$	$\chi^2(4)$
$\beta = 3.5$	Beta (2,2) Beta (2,3) Weibull (2,1) Normal (0,1) Uniform (0,2) Gamma (1,1) Gamma (2,1) Gamma (3.5,1)

native distributions are tested against two different gamma null distributions (β =1.5 and 4.0) at the α = 0.05 significance level with sample sizes 5, 15, and 25. As mentioned earlier, since this sequential test is location and scale invariant, the parameters of uniform and normal distribution are irrelevant. Therefore, the uniform (0,2) and the normal (0,1) were used instead of the ones defined by Woodfuff et al.

1. Gamma (1.5,1)
2. Gamma (2.5,1)
3. Gamma (4,1)
4. Weibull (2,1)

5. Weibull (3,1)

6. Normal (0,1)

7. Lognormal (0,1)

8. Lognormal (0,2)

9. Uniform (0,2)

10. Beta (2,2)

To specify a notation for each distribution being used in this thesis, gamma (2,1) is selected. The values, 2 and 1, correspond to shape parameter and scale parameter respectively.

The PDFs plots for all alternative distributions considered follow:

Beta:

$$f(x;\alpha,\beta) = \left[\frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)}\right] x^{\alpha-1}(1-x)^{\beta-1},\ 0 < x < 1;\ \alpha,\ \beta > 0$$

Normal:

$$f(x;\mu,\sigma) = \frac{1}{\sigma\sqrt{2\pi}} \exp\left\{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2\right\}, -\infty < x < +\infty;\ -\infty < \mu < +\infty;\ \sigma > 0$$

Uniform:

$$f(x;\delta_1,\delta_2) = \frac{1}{\delta_2-\delta_1},\ \delta_1 \geq x \leq \delta_1$$

Weibull:

$$f(x;\beta,\theta,\delta) = \frac{\beta}{\theta}\left(\frac{x-\delta}{\theta}\right)^{\beta-1} \exp\left\{-\left(\frac{x-\delta}{\theta}\right)^{\beta}\right\},\ x > \delta;\ \theta > 0;\ \beta > 0$$

Chi-squared:

$$f(x;\nu) = \frac{x^{(\nu/2)-1}e^{-x/2}}{2^{\frac{\nu}{2}}\Gamma(\nu/2)}, x > 0;\ \nu \in N$$

Lognormal:

$$f(x;\mu,\sigma)=\frac{1}{x\sigma\sqrt{2\pi}}\exp\left\{-\frac{1}{2}\left(\frac{\log x-\mu}{\sigma}\right)^2\right\},\ x>0;\ \sigma>0$$

Logistic(x, α, β):

$$f(x;\alpha,\beta)=\left\{\frac{\frac{1}{\beta}\exp[-(x-\alpha)/\beta]}{(1+\exp[-(x-\alpha)/\beta])^2}\right.,\ -\infty<x<+\infty;\ -\infty<\alpha<+\infty;\ \beta>0$$

Transformed Logistic(0,1):

$$f(x)=\frac{1}{(1+x)^2},\ x>0$$

Double-Exponential(λ):

$$f(x:\lambda)=\frac{\lambda e^{-\lambda|x|}}{2},-\infty<x<+\infty;\ \lambda>0$$

Transformed Double-Exponential(0,1):

$$F(x)=\begin{cases}0 & if \quad x<0\\ \frac{1}{2} & if \quad 0\geq x\leq 1\\ \frac{1}{2x^2} & if \quad 1<x\end{cases}$$

Cauchy(α,λ):

$$f(x;\alpha,\lambda)=\frac{1}{\pi\lambda\left\{1+\left(\frac{x-\alpha}{\lambda}\right)^2\right\}},-\infty<x<+\infty;\ \lambda>0$$

Transformed Cauchy(0,1):

$$f(x)=\frac{1}{\pi x(1+\ln^2 x)},\ x>0$$

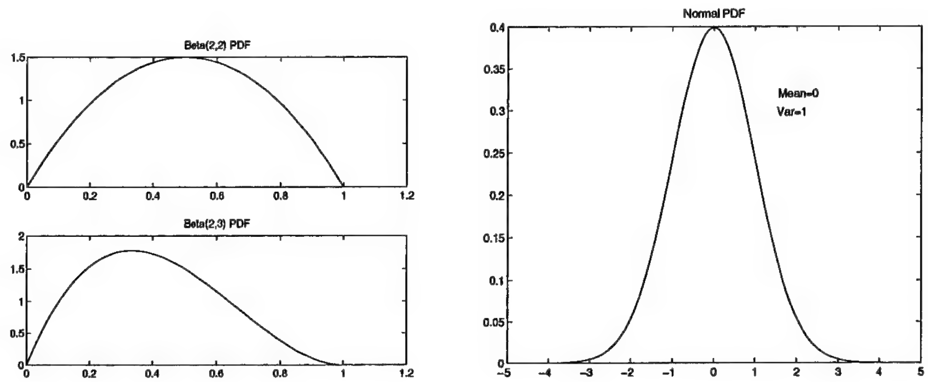


Figure 3.6 Beta and Norm(0,1) PDF

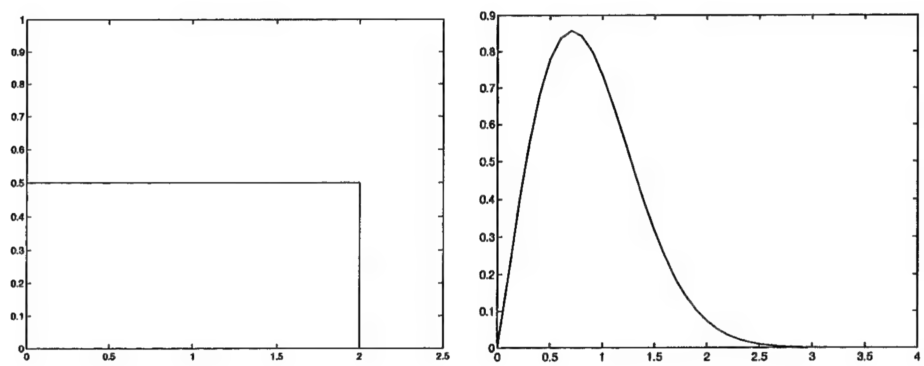


Figure 3.7 Uniform(0,2) and Weibull(2,1) PDF

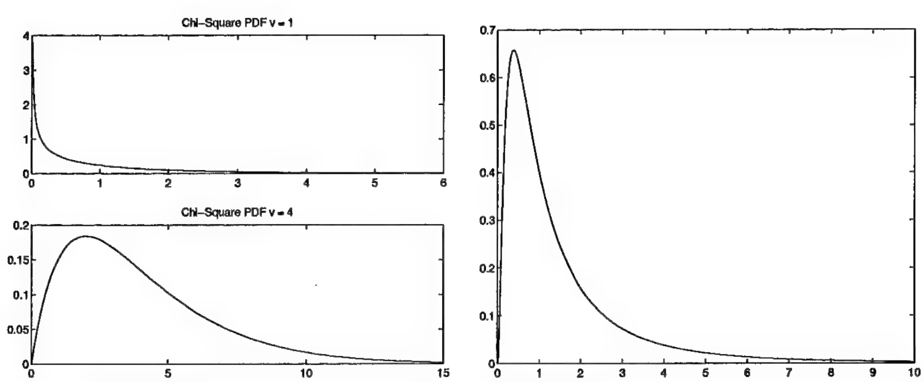


Figure 3.8 Chi-squared(ν = 1 and 4) and Lognormal(0,1) PDF

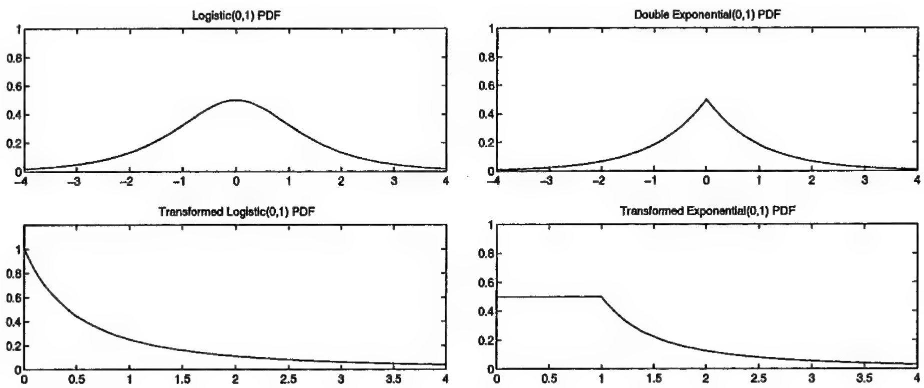


Figure 3.9 Logistic(0,1) and Double-Exp. PDF

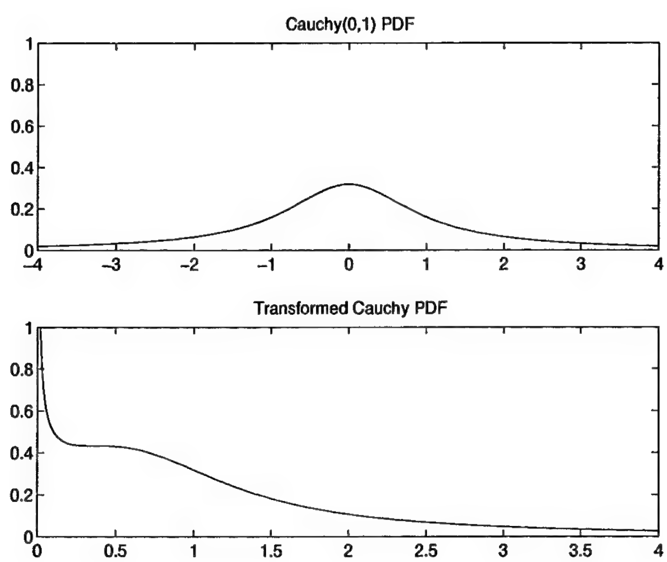


Figure 3.10 Cauchy(0,1) PDF

Table 3.5 Moments of Alternative Distributions

Distribution	$\sqrt{\beta_1}$	β_2
Gamma (0.5,1)	2.824	11.922
Gamma (1,1)	2.003	6.027
Gamma (1.5,1)	1.635	4.015
Gamma (2,1)	1.413	2.987
Gamma (2.5,1)	1.265	2.403
Gamma (3,1)	1.155	2.002
Gamma (3.5,1)	1.070	1.720
Gamma (4,1)	1.002	1.511
Weibull (2,1)	0.631	3.245
Weibull (3,1)	0.618	2.730
Normal (0,1)	0.000	3.000
Lognormal (0,1)	6.184	113.900
Uniform (0,2)	0.000	1.800
Beta (2,2)	0.000	2.143
Beta (2,3)	0.286	2.357
$\chi^2(1)$	2.828	15.000
$\chi^2(4)$	1.414	6.000

In addition, since this sequential test is based on the third and fourth sample moments, these moments for alternative distributions were derived as shown in Table 3.5.

3.5.3 Implementation of Power Study. The implementation of the power study was executed in nearly identical fashion to the Monte Carlo algorithm used to determine the attained significance levels. Recall that the goal of a power study is to measure the proportion of times that the test correctly rejects samples from distributions other than that specified by the null hypothesis. Instead of generating gamma samples with the shape parameter specified in that null hypothesis, the sample data generated by this power study came from specific alternate distributions. The sample skewness and kurtosis values were compared to appropriate critical values assuming our null hypothesis of a gamma is true. Again, the attained significance level for this omnibus test should be determined to conduct the power study. By simply changing the generator for the samples being tested, the basic algorithm used in the attained significance level study can be applied to the direct power study except for three exponentially-transformed alternative distributions. Since random number generation routines for the transformed distributions in *MATLAB* don't exist, new

random number generators were coded by employing the inverse transformation method and then these were applied [12]. The original probability density functions and transformed versions for those three distributions are listed in figures 3.9 and 3.10. In addition, for the comparative analysis with Woodruff et al., the only other modifications to the algorithm that were needed are:

- only sample sizes studied by them will be considered.
- only 40,000 samples instead of 100,000 samples used in determination of critical value and attained significance level will be used for the purpose of reducing run time. According to estimation theory [78: 326,9], $n \geq 40,000$ samples, guarantee that the first two decimal places are accurate. This was deemed sufficient for our objective of the power study.

The following are the steps for the power study.

1. Generate random deviates from the alternative distribution (H_a) for a fixed sample size n.
2. Load the critical values of the null hypothesis (H_0) found in earlier study.
3. Calculate the test statistics for skewness and kurtosis.
4. Compare the calculated test statistic to the appropriate critical value of null hypothesis.
5. Count the number of rejections.
6. Compute the power of the test for the attained significance levels.

The flowchart is also shown in the Figure 3.11.

This test has several options that can be applied since the test is based on two test statistics that can be used in several possible combinations. It is one of the advantages of conducting two moment-based sequential tests. As a result, this test would demonstrate more consistent power than any single test would suggest over broad range of alternatives. The three options are

- *Option 1:* Conduct the power study using sequential tests as a primary evaluation on the two sets of alternatives (**Sequential Test**).

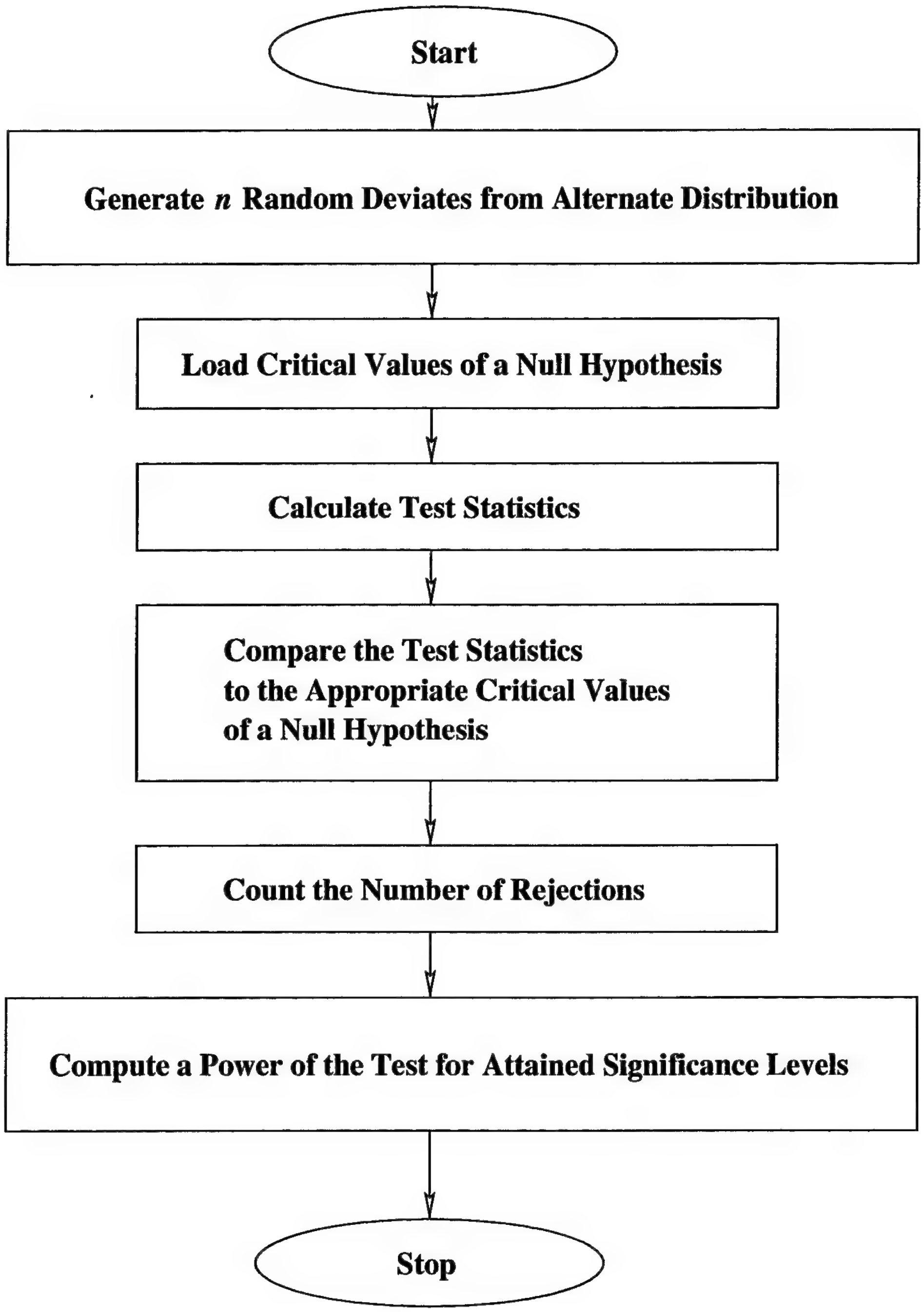


Figure 3.11 Flowchart of Power Study

Table 3.6 Comparison of Moments

Distribution	$\sqrt{\beta_1}$	β_2
Gamma (1.5,1)	1.635	4.015
Beta (2,2)	0.000	2.143

- *Option 2:* Conduct the power study by individual test for both-side with the set of common alternatives(**Individual Two-tailed Test**). The task was to analyze the two-sided skewness and kurtosis tests separately against the sample set of common alternatives to determine which tests were most powerful against a particular alternative distribution. This test will help us determine the significance levels for the two component tests when they are employed sequentially. Recall that choosing the appropriate significance levels is very important because the power will vary with the combination of each component test. This makes this test more powerful and result in better power.

- *Option 3:* Conduct, with the set of common alternatives, the directional one-sided versions of the skewness and kurtosis tests respectively focused on quantifying any expected increase in power (**Directional One-tailed Test**). It is obvious that the one-tailed test yields better power than the two-sided version because of wider rejection region. The one-sided version, however, is recommended when the user has prior knowledge as to which tail to test, upper or lower. Under the circumstances that one has such a prior knowledge, it may be advisable to use the more powerful of the two tests individually since the power of the sequential test will usually not exceed that of its strongest component at the same significance level. For one-sided test in this research, the tail to be tested was chosen by comparing the theoretical values for the moments. Suppose that we want to make a test for the gamma shape $\beta = 1.5$ against Beta (2,2). The theoretical values from Table 3.5 are given by: As shown in Table 3.6, both moments of beta (2,2) are less than those of gamma (1.5,1). Hence, one could use a lower-tail skewness or a lower-tail kurtosis test. Small set of alternatives and each corresponding tail chosen for one-tailed test power studies are shown in Table 3.7 and Table 3.8.

Table 3.7 Distributions for One-sided Skewness Tests Conducted

H_0	H_α	Tail Tested
Gamma (1,1)	Gamma (3.5,1)	Lower
	Normal (0,1)	Lower
	Weibull (2,1)	Lower
	Lognormal (0,1)	Upper
	XLogistic (0,1)	Upper
Gamma (3.5,1)	Gamma (1,1)	Upper
	Gamma (2,1)	Upper
	Beta (2,3)	Lower

Table 3.8 Distributions for One-sided Kurtosis Tests Conducted

H_0	H_α	Tail Tested
Gamma (1,1)	Gamma (3.5,1)	Lower
	Normal (0,1)	Lower
	Uniform (0,2)	Lower
	Lognormal (0,1)	Upper
	XLogistic (0,1)	Upper
Gamma (3.5,1)	Beta (2,2)	Upper
	Uniform (0,2)	Upper
	Gamma (1,1)	Upper
	Gamma (2,1)	Upper

3.6 Conclusion

This chapter described the methodology used to generate the critical values and the attained significance level of the sequential test and to perform a power study. Unlike the other goodness of fit tests, the attained significance level was considered in implementing the tests. An extensive set of Monte Carlo simulations were coded and run for generation of critical values by employing percentile function which can be applied easily in *MATLAB* for determination of the attained significance level, and for the power study against two sets of various alternative distributions. The next chapter discusses the results that were found.

IV. RESULTS AND ANALYSIS

4.1 Introduction

This chapter discusses the results and analyses of the sequential test. To help readers envision the full scope of the analysis a flow chart of key activities and specific applications is provided in the Figure 4.1. The flow chart outlines five time-dependent main activities and nine specific applications involved in completing these stages of the sequential test. First of all, critical values for skewness and kurtosis at sample size $n = 5(5)50$ for each gamma shape $\beta = 0.5(0.5)4$ were obtained via Monte Carlo simulations consisting of 100,000 iterations each.

Once the critical values for the two test statistics had been derived and analyzed, the next step was to determine an overall significance level for the omnibus test. Recall that individual tests can be paired at any number of significance levels, each of which yields a different overall significance level for the omnibus test. In a similar fashion to determine any critical value, attained significance levels had to be determined and tabled. A table look up in the attained significance level table of combined significance levels for two components is somewhat difficult. Thus, contour plots [12] are also employed that simplify the employment of the sequential test. Then, a test example and the analysis for attained significance levels with some insights of the power study are carefully documented.

Once determination of critical values and attained significance level through Monte Carlo simulation had been completed, the next step was to conduct a power study. For this power study, the skewness and kurtosis test statistics were computed for each sample. These statistics were then compared to the critical values at each significance level for the sequential test as well as for the individual tests. As a result, the number of rejections and acceptances, which tell one the degree of performance, were determined by comparison between test statistics and critical values. The power of the test is the number of rejections divided by the total number of test repetitions. One seeks power as close to 1 as possible for any distribution that is not the gamma distribution specified in

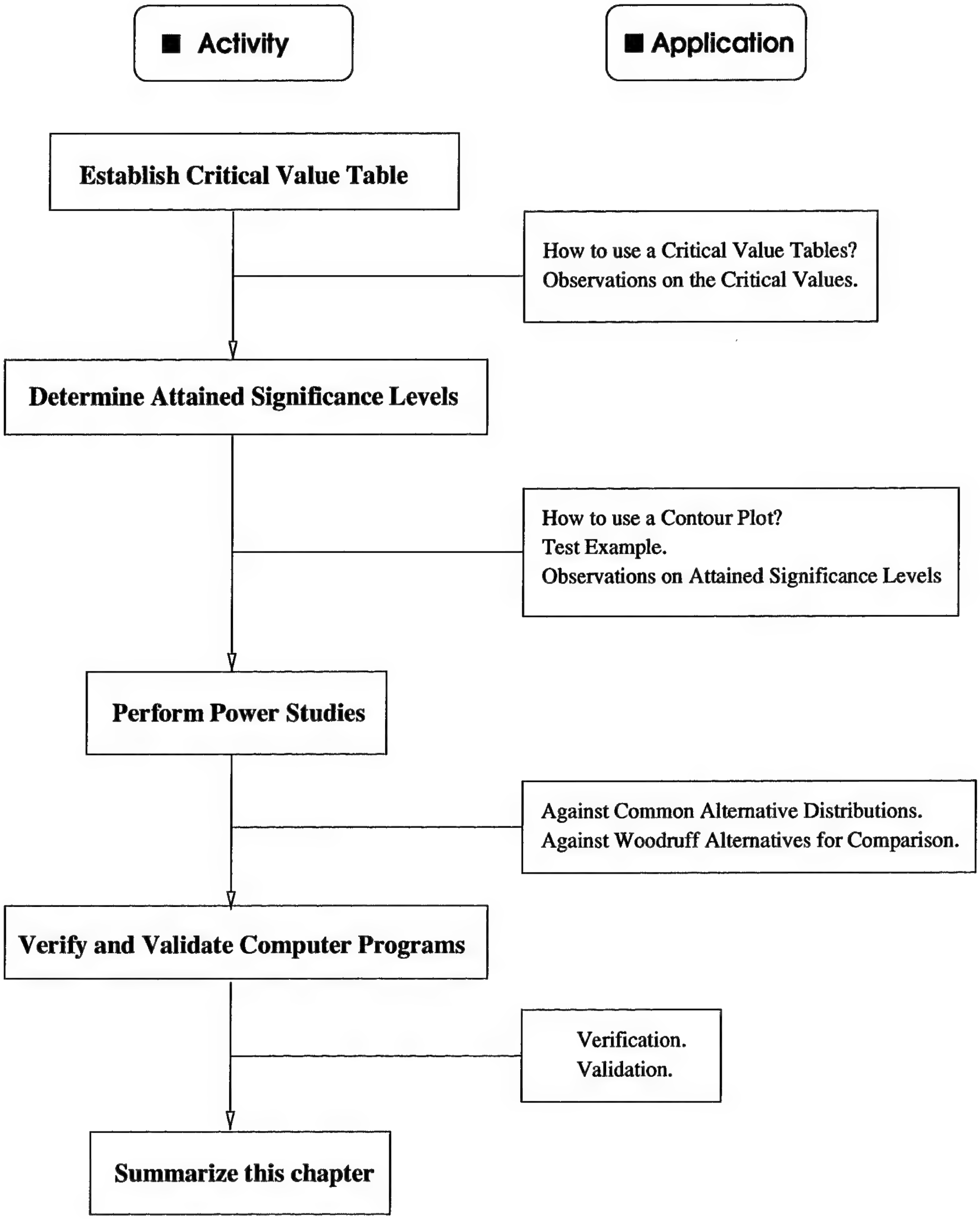


Figure 4.1 Flow Chart for Analysis and Outline of Sequential Tests

the null hypothesis. As already noted earlier, the power studies consist of two groups of studies. The first set is of common alternatives. Those alternatives represent the more common alternative distributions being used in the goodness of fit test field. Hence, it is obvious that they are good candidates to identify any strength and weakness in the power of this sequential test. Hence, power studies were performed for these common alternatives. Specifically sequential test using two-tailed test for two component tests were first performed. Then, power studies were also conducted for individual two-tailed tests, individual one-tailed tests, and sequential directional variants tests. The other set consists of Woodruff alternatives [81], which play a major roll as benchmarks in this thesis effort because they help reveal the relative strength or weakness of the power of the sequential test. At the end of the analysis of these power studies, analysts should be able to evaluate how well this test works against a broad range of alternative distributions.

The power studies were performed assuming the Monte Carlo simulations that were developed for this thesis produced valid results. Because the Monte Carlo simulations are not verified and validated yet, it is no wonder that engineers and analysts who use such model outputs to aid in making design recommendations and the managers who make decisions based on these recommendations look upon the model with some degree of skepticism. To reduce this skepticism and to increase the model's credibility, numerous verification and validation techniques [4: 399-425] were applied throughout this research effort.

A more detailed discussion of these topics is presented in the final section of this chapter. The following sections summarize the detailed stages accomplished for this research effort.

Next, the discussions about the applications for the critical values found through Monte Carlo simulation is presented.

4.2 Critical Values

Use of these tables is shown first, followed by some observations and a discussion of the findings.

4.2.1 Use of Tables. To demonstrate use of the critical value tables, a portion of the tables for sample skewness for $\beta = 1$ is given in Table 4.1.

Table 4.1 Skewness Lower/Upper Tail Critical Values : $\beta = 1.0$

Sample	Significance Level									
Size	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	-1.161	-0.988	-0.874	-0.78	-0.704	-0.639	-0.588	-0.541	-0.499	-0.464
10	-0.459	-0.333	-0.25	-0.188	-0.14	-0.096	-0.061	-0.029	-0.003	0.022
15	-0.138	-0.034	0.034	0.082	0.123	0.156	0.188	0.218	0.244	0.266
20	0.051	0.156	0.216	0.268	0.306	0.337	0.365	0.389	0.411	0.431
25	0.191	0.286	0.337	0.38	0.42	0.451	0.479	0.503	0.524	0.543
30	0.301	0.384	0.436	0.477	0.511	0.54	0.564	0.588	0.61	0.628
35	0.398	0.473	0.52	0.561	0.594	0.623	0.648	0.67	0.689	0.707
40	0.452	0.528	0.578	0.616	0.647	0.673	0.698	0.718	0.738	0.756
45	0.511	0.591	0.638	0.674	0.705	0.731	0.755	0.776	0.794	0.811
50	0.568	0.637	0.684	0.719	0.75	0.777	0.796	0.816	0.833	0.85

Sample	Significance Level									
Size	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	1.486	1.477	1.468	1.459	1.45	1.441	1.432	1.424	1.415	1.406
10	2.464	2.389	2.335	2.291	2.249	2.214	2.176	2.143	2.112	2.08
15	2.971	2.834	2.731	2.652	2.586	2.529	2.475	2.427	2.383	2.34
20	3.286	3.097	2.966	2.868	2.785	2.713	2.654	2.6	2.548	2.502
25	3.458	3.241	3.096	2.993	2.904	2.826	2.759	2.698	2.645	2.588
30	3.646	3.379	3.213	3.088	2.985	2.901	2.826	2.762	2.708	2.658
35	3.714	3.425	3.26	3.135	3.03	2.943	2.869	2.801	2.744	2.689
40	3.794	3.51	3.336	3.194	3.082	2.999	2.924	2.857	2.795	2.741
45	3.846	3.526	3.334	3.203	3.095	3.008	2.929	2.865	2.805	2.758
50	3.868	3.558	3.357	3.217	3.114	3.021	2.939	2.869	2.81	2.759

Suppose that we wish to test the null hypothesis (the sample data comes from a population characterized by a gamma distribution with shape $\beta = 1.0$) using a sample of size $n = 15$ from the assumed null distribution.

The test procedure for the skewness test, assuming a gamma random sample X, is given by the following steps:

1. Identify the shape parameter for the selected hypothesis; $\beta = 1$.

2. Specify the significance level(α) of the test: The test is conducted for significance level $\alpha = 0.01$.

3. Compute the test statistic: $\sqrt{b_1}$.

4. Extract the critical value from the appropriate table. For the row, sample size $n = 15$ is selected. For the column, this is a two-tail test as noted on formal statement of the sequential test in the previous chapter. Since the significance level (α) chosen is 0.01, the significance level column on the table given is respectively $\frac{\alpha}{2} = 0.005$ (lower tail) and $(1-\frac{\alpha}{2}) = 0.995$ (upper tail). Critical values found: lower tail $\sqrt{b_1}_{(0.005)} = -0.138$, upper tail $\sqrt{b_1}_{(0.995)} = 2.971$.

5. Compare the computed test statistic value to the critical value extracted from the table.

6. Suppose the test statistic of skewness for the above gamma random sample equals 2.291. So, $-0.138 < \sqrt{b_1} = 2.291 < 2.971$. Therefore, one concludes that H_0 is true.

4.2.2 Observations on the Critical Values. Tabled lower/upper $\sqrt{b_1}$ and b_2 values for shape parameters $\beta = 0.5(0.5)4$ are listed in Appendix A. Graphical displays can be used to display trends. A scatter plot is one of most widely employed visualization tools. The upper and lower tail critical values at several significance levels were plotted against the sample size for each value of the gamma shape parameter. For illustration purposes, the skewness and kurtosis critical values for $\beta = 1$ are presented in Figure 4.2. All critical value plots for a given shape parameter are available in Appendix B.

The significance levels selected for the plots are 0.01, 0.10, and 0.20 for lower tail test and 0.8, 0.9, and 0.99 for upper tail test. The lower tail plot can be found at the lower part of the figure and the upper tail plot in the upper part.

Looking at the trend lines closely on the plots and comparing those trend lines to the values in the table of critical values generated in this thesis, certain obvious trends can be observed.

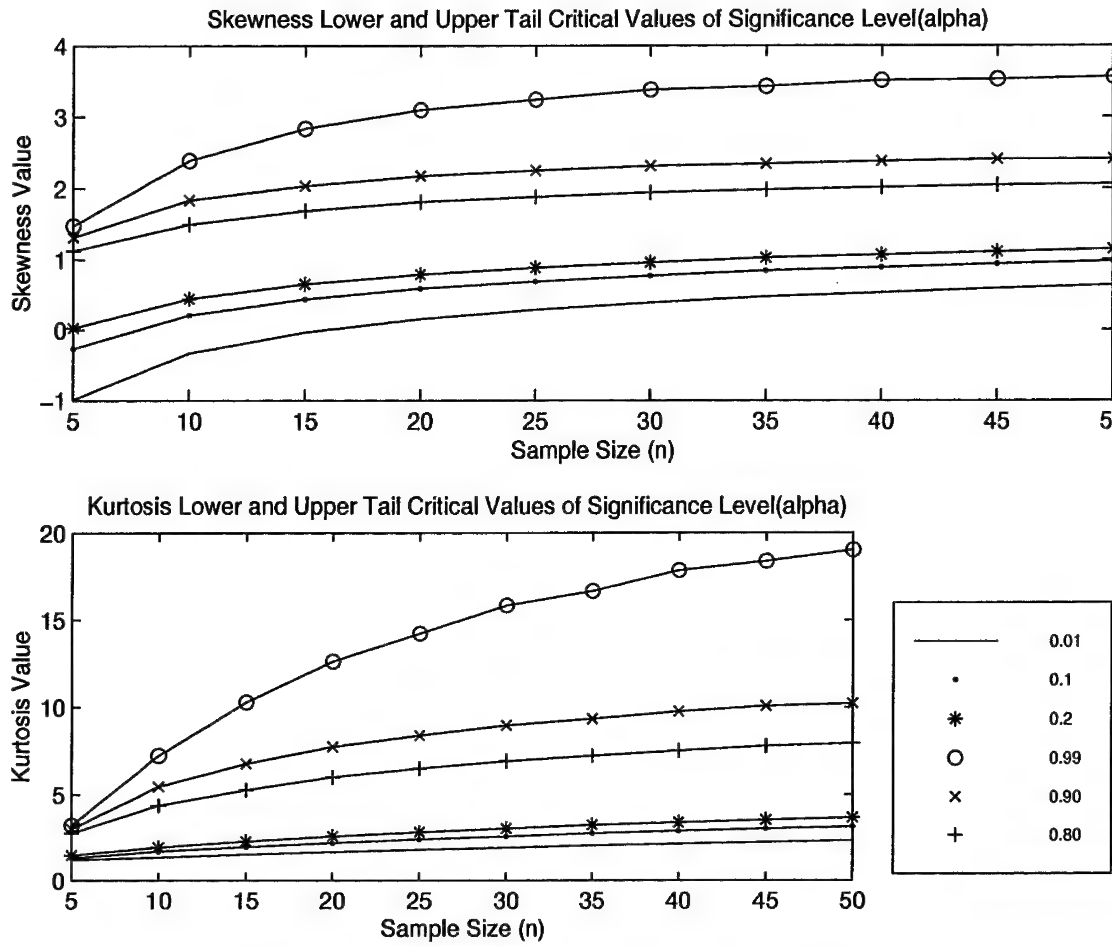


Figure 4.2 Critical Values for Skewness and Kurtosis, β=1

It can be shown, as sample size increases, the critical values converge toward theoretical values for skewness and the kurtosis. The theoretical values are shown in Table 3.5. It is obvious that the range for sample skewness is at least four times narrower than that for kurtosis. It can also be seen that the sample skewness critical values increase and converge more rapidly than those for kurtosis; this characteristic might make the $\sqrt{b_1}$ test more powerful than the b_2 test in many cases. On the contrary, the high variability in b_2 seen in the scatter plots is also apparent. Some important observations can be made from a comparison between the $\alpha = 0.99$ and both $\alpha = 0.8$ and $\alpha = 0.9$ levels. First, there is a significant spread in the upper tail between $\alpha = 0.99$ and both $\alpha = 0.8$ and $\alpha = 0.9$ over all shape parameters. Secondly, the slope of convergence toward

the theoretical values is fast at small sample sizes. Finally, the slope gets decreases as sample size increases. Additionally, the general variability of the critical value of the kurtosis test decreases as shape parameter increases. However, it should be noted that the lower tail kurtosis values do not demonstrate a similar level of variability, but rather remain relatively constant. This is especially true for sample size 5. The critical values of the kurtosis for each lower and upper tail are nearly the same over all shape parameters. These observations lead to some expectations for the kurtosis test. First, the kurtosis test would work well with a lower tail test. Second, the test would contribute more to the sequential test power at larger values of the shape parameter than at smaller values. As the shape parameter increases, a higher power is expected. Third, in this sequential test for a three-parameter gamma distribution, the kurtosis test will be dominated by the skewness test due to the high degree of variability in the upper tail kurtosis values for sample sizes greater than or equal to 10. Validation of these expectations is left to the individual two-tailed tests presented later.

Another observation, not to be overlooked in the plots, is that the lower tail critical values for both skewness and kurtosis are monotonically increasing with sample size. However, the behavior of the upper tail is different for each value of the shape parameter. When the shape parameter β is less than one, the upper tail critical values monotonically increase displaying different slopes for each value of the significance level. However, the rate of increase for the upper tail $\sqrt{b_1}$ values gradually becomes smaller, and remains relatively constant at $\beta = 1.5$, while the b_2 values continue to increase, although not as fast as with smaller shapes. When $\beta > 2$, note the upper tail skewness values for $\alpha = 0.99$ begin to display a decreasing tendency for increasing sample size; this is also true for the upper tail $\sqrt{b_1}$ values for level $\alpha = 0.9$ at $\beta = 2.5$. The values for the 0.8 level, however, do not show the decreasing trend over all shapes. The behavior of the critical values above is not surprising since the critical values should be converging to the theoretical values as n gets big. If n gets large enough they should get close together (e.g. $n = 2000$). With the observation above,

Table 4.2 Partial Attained Significance Levels ($\beta = 1$, $n = 5$)

Skewness Test(α)	Kurtosis Test(α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
0.01	0.015	0.025	0.035	0.045	0.055	0.065	0.075	0.085	0.094	0.104
0.02	0.025	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.099	0.109
0.03	0.035	0.04	0.045	0.055	0.065	0.075	0.085	0.095	0.104	0.114
0.04	0.045	0.05	0.055	0.06	0.07	0.08	0.09	0.1	0.109	0.119
0.05	0.055	0.06	0.065	0.07	0.075	0.085	0.095	0.105	0.114	0.124
0.06	0.065	0.07	0.075	0.08	0.085	0.091	0.1	0.11	0.119	0.129
0.07	0.075	0.08	0.085	0.09	0.095	0.1	0.106	0.115	0.124	0.134
0.08	0.085	0.09	0.095	0.1	0.105	0.11	0.115	0.121	0.129	0.139
0.09	0.095	0.1	0.105	0.11	0.115	0.12	0.125	0.13	0.136	0.144
0.1	0.105	0.11	0.115	0.12	0.125	0.13	0.135	0.14	0.145	0.151

it is expected that the lower tail, which show lower degree of variability for both component tests, would contribute more to the power of the sequential tests.

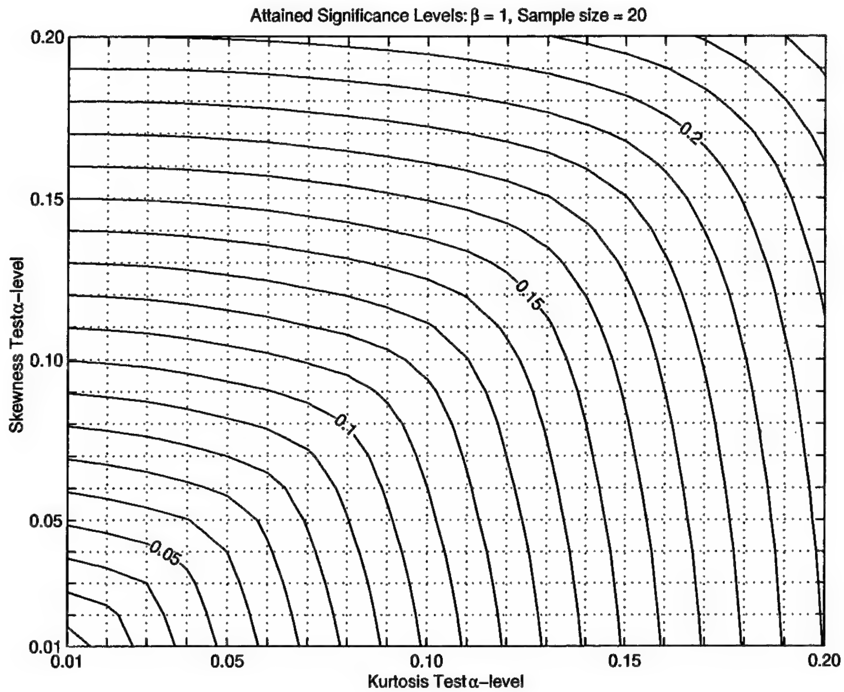
4.3 Attained Significance Levels

Once the critical values for the two test statistics have been derived and analyzed, then, an appropriate significance level must be determined for each test such that when combined sequentially, they yield the desired overall significance. Recall that the individual tests can be paired at any number of significance levels, each of which yields a different overall significance level for the omnibus test.

The Monte Carlo simulation enabled us to approximate these levels for all shape parameters, sample sizes selected, and all combinations of significance levels for both tests for $\alpha = 0.01(0.01)0.20$. The results of the calculations can be presented in tabular format as shown in Table 4.2 for $\beta = 1$.

For selection of each significance level for two components, Using only the tabular format is less effective and quite time consuming. To obtain each significance level, a contour plot [12] can also be employed. The contour plot significantly facilitates choosing the combination of each α level for two tests roughly. Then tabular format can be used to get precise combination for each significance level. The attained significance levels were drawn for each shape and sample size

Figure 4.3 Contour Plot for Overall Significance Levels ($\beta = 1$, $n = 20$)



combination. The attained significance level for $\beta = 1$ can be found in Appendix C. Note also that the only contour plots are shown in Appendix D are ones for $\beta = 0.5$.

4.3.1 Test Example. The contour plot for shape, $\beta = 1$ and sample size 20, is displayed in Figure 4.3 for illustration purposes. The first step of the sequential test is to determine an overall significance level using contour plot. Once one has determined the overall significance level, the next step is to get an individual significance level for the skewness and kurtosis components. From the given tabular and contour plot, as mentioned earlier, one can get numerous combinations of significance levels.

Let's suppose that we conduct this sequential test at an overall significance level, say α=0.10 for a sample of size 20 with an hypothesized gamma shape $\beta = 1$. Some combinations we can obtain from Table 4.2 and Figure 4.3 are shown in Table 4.3.

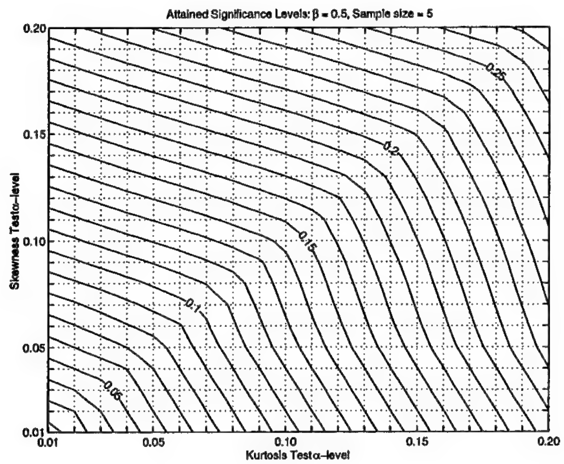
Table 4.3 Possible Significance Level Combinations

Significance Levels		
$\sqrt{b_1}$ Test	b_2 Test	Attained Level
0.050	0.092	0.1
0.060	0.089	0.1
0.080	0.080	0.1
0.090	0.060	0.1

At this point, numerous possible combinations force us to decide which combination of two components should be applied. To make the test more effective, prior knowledge is required to select a particular combination of levels among those possible options. Normally, an analyst would conduct the test with equal significance levels with no prior information using 0.08 for skewness and kurtosis test. The discussion of the case where the analyst has a prior knowledge about an alternative distribution he or she is going to test will be delayed until later. Now, provided that we conduct the skewness at α_1=0.08 and the kurtosis test similarly at α_2=0.08, we can look up the critical value from the critical value Table 4.1 for the same shape parameter and sample size. Performing two-tail test, the low tail critical value can be found in the $\frac{\alpha_1}{2}$ = 0.04 column and (1-$\frac{\alpha_1}{2}$) = 0.96 column for the skewness test. The low and upper tail critical values are 0.389 and 2.6 respectively. Using Appendix A in a similar fashion, for the kurtosis test, the lower tail value is 1.9 and the upper tail value is 9.974.

For the case where prior knowledge about potential alternatives are available, one simply selects the higher significance level for the test that he or she expects to be more powerful. This is likely to be more powerful in discriminating among the possible alternatives since the power is proportionally increasing as the α level gets bigger.

4.3.2 Observations on Attained Significance Levels. The trend of attained significance levels might be directly related to the power of this sequential test for a three-parameter gamma distribution. To find out the trends, it is more useful to look at the contour plots so that we can easily get some insights, which can lead us to utilize this test more effectively.



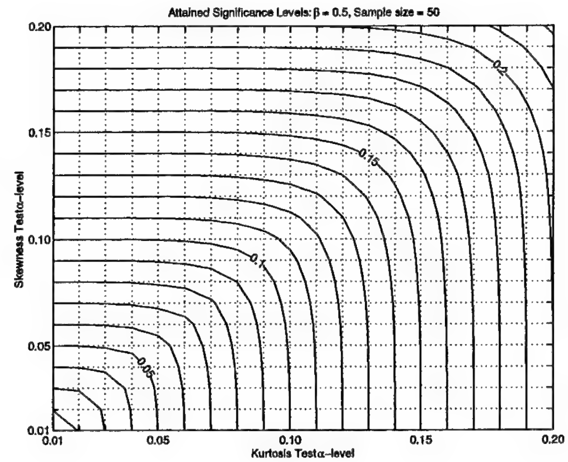


Figure 4.4 Linear vs. Curvature Trend

A trend of increasing curvature (Figure 4.4) is very apparent over all shape parameters, as sample size increases. For instance, look at an attained significance level, $\alpha = 0.15$. The 0.15 level line on the contour plot with sample size 5 is a slightly curved line (linear trend), but the 0.15 level on the contour plot with sample size 50 lines up almost directly with the grid lines of x-y axis (curvature trend). These trends can be analyzed as follows relative to the power of sequential test. First, the significance level for each individual test varies a lot with linear. With curvature, the skewness-level of one test remains almost constant, while the kurtosis-level varies over a large range. For example, suppose that one makes a combination of α-levels of each component with $\alpha = 0.15$ for the plot with curvature trend. The skewness-level remains the same (0.15) until the kurtosis-level reaches 0.11; or similarly, the kurtosis-level remains the same (0.15) until the skewness-level reaches 0.08. For a short distance, that is, for the rest of the portion on the (0.15) level line, the significance level of each individual test varies in a manner similar to the linear. However, note that the level with linear varies greatly over all ranges on the line. This might imply that the power of sequential test would be determined by using more possible combinations at small sample sizes. Hence, it is important to more carefully select a significance level for each skewness and kurtosis

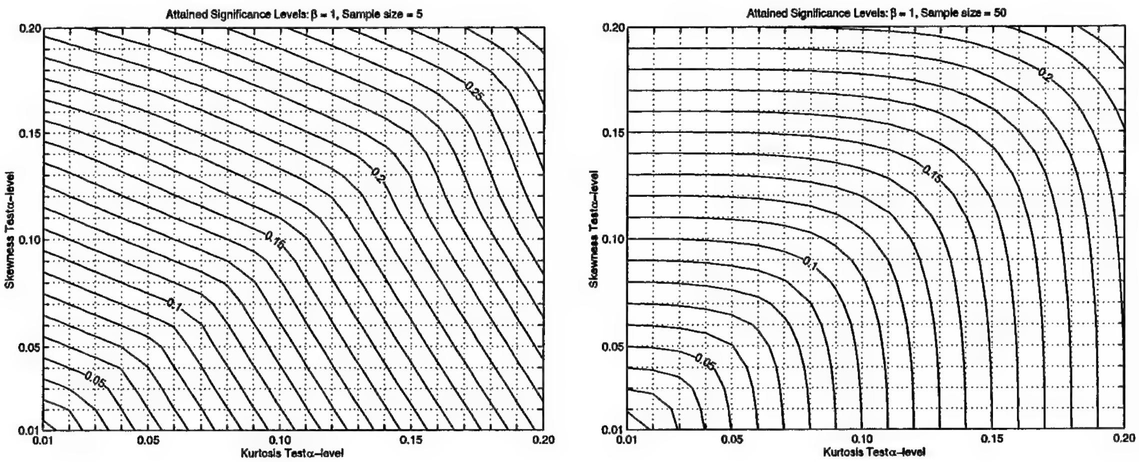


Figure 4.5 Decreasing Density for Large vs. Small Samples

test at small sample size than for larger sample sizes. Once again we use the individual two-tail power study to validate the above expectation.

In addition, a trend in increased curvature is a good feature for this sequential test since this makes it possible to conduct each individual test with higher significance levels, which are close to the overall significance level. It is true that power increases when one makes a test with a higher overall α-level. In the case where little information is available, the strategy of picking individual test levels close to the overall significance level will preserve better power performance.

Another observation is, as sample size increases, we note a decreasing trend in density for the contours along the diagonal (toward upper right corner). In other words, there are higher attained α-level lines at the upper right corner with smaller sample sizes. This can be seen in Figure 4.5. It should be noted that one can obtain a higher significance level for each component test at larger sample sizes with fixed α level. This suggests the sequential test will be powerful at larger sample sizes than smaller sample sizes. However, the decreasing density gets reduced with a large shape parameter, i.e. as shape increases, the contour lines increase as seen in Figure 4.6. What this implies is better performance in power with a smaller shape parameter. This can be verified by obtaining higher significance level for each component test with fixed attained significance level.

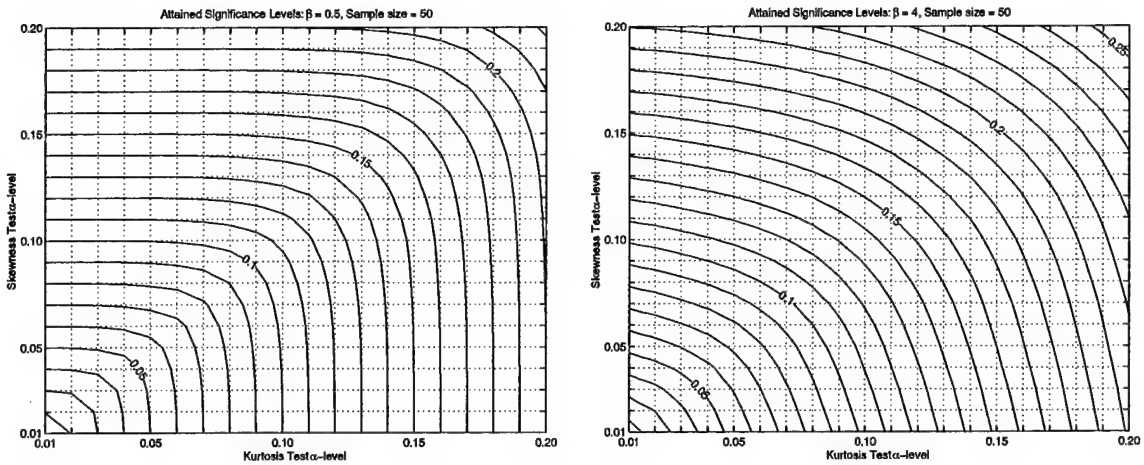


Figure 4.6 Increasing Density with Larger Shape

4.4 Power Study

The determination of critical values and the attained significance level through Monte Carlo simulation was completed. The next step involves two sets of power studies. The outline of the power studies is shown in Figure 4.7.

For the common alternative distributions, the sequential test power is analyzed. In addition to the sequential test, an individual two-tailed test power study was conducted, which provides insights in selecting the appropriate combinations of significance levels to get better power. Recall that the power performance varies by the different combination of significance levels chosen.

The directional one-tailed test followed by an individual two-tailed test power study has some merits. As long as one has some prior knowledge about the alternative he or she is trying to test, the one-tailed test will certainly demonstrate better power than that of the original two-tailed test. To verify this, a directional one-tailed power study was performed.

As a final set of test for common alternative power studies, a sequential directional variants power study was tried. If directional one-tailed test power certainly demonstrates improved power, it is logical to expect that directional variants of the sequential tests employing an appropriate

one-sided version that substitutes the original two-sided version, would also be more powerful than the power of the sequential test using the two-sided version. This improved power is verified using lognormal alternative.

To observe the performances of the sequential tests, the individual two-tailed tests, the directional one-tailed tests, and the sequential directional variants tests listed above, power studies start with common alternatives in the following section.

4.4.1 Common Alternatives. For common alternatives, the sequential power study was first documented along the sequential power tables. The individual skewness and kurtosis tests were then examined against those alternatives to determine which test was more powerful against certain alternatives. The corresponding complete power comparison plots between sequential and individual two-tailed tests are shown in Appendix F. Finally, a one-tailed test for each component test for a subset of alternatives was made to explore the behavior of power for the sequential test as well as for individual tests.

4.4.1.1 Sequential Test Power. A power study was carried out using 40,000 samples of sizes 5, 15, 25, and 50. Tables 4.4 through 4.11 show the results of the power study for common alternative distributions with null hypotheses: gamma $\beta = 1$; gamma $\beta = 3.5$ with significance levels $\alpha = 0.05$ and $\alpha = 0.1$. Each of the tables that follow report the power for the sequential test for two or three different combinations of significance levels for the skewness and kurtosis tests that yield an attained significance level as close as possible (± 0.02) to the $\alpha = 0.05$ and 0.1. In most cases, the power of a sequential test result is between the individual two-tailed skewness test and kurtosis test as shown in the power comparison plots in the Appendix F. In many cases, the skewness test occupies the most powerful position, in some cases, the kurtosis test does. Therefore, in choosing the significance level for both component tests, one combination was chosen at the boundary of skewness, another, at that of kurtosis, and the other (if it is shown) using similar significance level for both components. Doing so helps one identify not only the full range of power

covered by an individual significance level, but which combinations can contribute to higher power for the attained significance levels as well. The sequential power tables with all combinations of skewness and kurtosis tests for $\beta = 1$ are tabled in Appendix E.

Prior to the analysis of the sequential test power, a prediction of this power was made based on the skewness and kurtosis values that determine the shape of a specific distribution. The supposition that the narrower range of the skewness critical values and rapid convergence would make the skewness test more powerful than the kurtosis test, in most cases was sustained again. Thus, we expect that skewness will affect the power more strongly than kurtosis. However, we also expect that the power of those alternative distributions with similar skewness and kurtosis as those of the null hypothesis will reveal relatively poor power. Similarly, a graphical analysis of the alternative distributions provides some insights about the behavior of the sequential power. That is, if the null hypothesis distribution differs greatly from the distribution in a specific alternative, higher power is expected. Of course, in the case where the null distribution and the alternative distribution are exactly the same (e.g. H_0: gamma (1,1) vs. H_a: gamma (1,1)), the power should be the same as the level of significance. The power for the previous case is a very good example of verification for coding of the power studies. More detailed verification and validation will be given later. The next section discusses the power results for a null hypothesis: gamma, $\beta = 1$; and gamma, $\beta = 3.5$.

The general trends in this sequential test power are

- As the significance level increases, the power increases.
- As the sample size increases, the power increases.

Of course, the common power results above are not surprising, for the first item, since the Type I error is in inverse proportion to the Type II error. As the Type II error decreases, the power obviously increases. Regarding the second item, it also makes sense. With the larger samples, more information is available. Consequently, higher power can be achieved. In general, the power results

of the sequential test (Tables 4.4 through 4.11) based on skewness and kurtosis showed significant power over a variety of alternatives chosen and demonstrated that it is powerful enough to be used in the goodness of fit test field. The following sections include detailed discussion.

Power Results for Shape Parameter $\beta = 1.0$. The power of the sequential test is presented in Table 4.4 through Table 4.7. The results of the power study over both shape parameters $\beta = 1$ and 3.5 fall into three categories. Our notation XLogistic, XCauchy, and Xdouble-Exp. refer to the transfromed logistic, Cauchy, and double-exponential distributions respectively.

Category	Alternative Distributions
1	Beta, Uniform, Normal, Weibull, XLogistic, XCauchy, and Xdouble-Exp.
2	Gamma($\beta = 2$ and 3.5), $\chi^2(\nu = 1$ and 4), and Lognormal
3	Gamma($\beta = 1$)

First, when null hypothesis distributions differ greatly from all of the alternatives in shape with the exception of gamma (β=2 and 3.5), $\chi^2(\nu = 1$ and 4), and lognormal (0,1) distributions; the sequential test demonstrates excellent power. The sequential test correctly rejects at least 71.4% of the samples over category 1 alternatives, as shown in the table above, for sample sizes 50 and a significance level 0.05. At significance level 0.1, the power was of course improved because of the increased α level. The least rejection percentage increased from 71.4 to 82% for the Weibull distribution that shows the weakest power among category 1. Secondly, as noted in the literature, gamma distributions have as special cases the χ^2 distribution when shape parameter $(\beta) = \nu/2$ and location parameter $(\delta) = 1/2$. The gamma distribution shares with the lognormal distribution the property of closely mimicking a normal distribution when β is sufficiently large, $\beta > 15$. Therefore, for those alternatives which have a close relationship with null hypothesis in shape, specifically, the alternatives that do not differ greatly in shape, such as gamma, χ^2, and lognormal distributions (Category 2), the power of the sequential test demonstrates relatively lower power than that of other distributions. The third group of power study represent results for the gamma alternatives

Table 4.4 Power of Sequential Tests for Gamma Distribution, β=1 ($\alpha = 0.05$)

Sample Size	Beta(2,2) Power	Beta(2,3) Power	Uniform(0,2) Power	Normal(0,1) Power	Weibull(2,1) Power	Lognorm(0,1) Power	XLogistic(0,1) Power	Significance Level Attained	$\sqrt{b_1}$ test	b_2 test
5	0.107	0.080	0.115	0.116	0.069	0.069	0.213	0.050	0.04	0.02
	0.071	0.055	0.088	0.073	0.048	0.070	0.217	0.050	0.02	0.04
15	0.597	0.374	0.622	0.569	0.243	0.123	0.409	0.049	0.04	0.02
	0.500	0.294	0.564	0.482	0.184	0.121	0.392	0.050	0.02	0.04
25	0.902	0.667	0.918	0.816	0.409	0.159	0.549	0.051	0.04	0.03
	0.881	0.623	0.909	0.790	0.369	0.152	0.520	0.051	0.03	0.04
50	1	0.976	1	0.984	0.714	0.247	0.788	0.048	0.04	0.03
	0.999	0.966	1	0.980	0.678	0.228	0.759	0.048	0.03	0.04

Table 4.5 Power of Sequential Tests for Gamma Distribution, β=1 ($\alpha = 0.05$)

Sample Size	Gamma(1,1) Power	Gamma(2,1) Power	Gamma(3.5,1) Power	$\chi^2(1)$ Power	$\chi^2(4)$ Power	XCauchy(0,1) Power	XdblEXP Power	Significance Level Attained	$\sqrt{b_1}$ test	b_2 test
5	0.051	0.050	0.058	0.092	0.050	0.412	0.173	0.050	0.04	0.02
	0.051	0.042	0.041	0.098	0.042	0.411	0.172	0.050	0.02	0.04
15	0.047	0.079	0.141	0.078	0.079	0.744	0.383	0.049	0.04	0.02
	0.047	0.064	0.107	0.078	0.064	0.733	0.373	0.050	0.02	0.04
25	0.046	0.105	0.211	0.085	0.105	0.882	0.524	0.051	0.04	0.03
	0.046	0.080	0.187	0.079	0.094	0.870	0.499	0.051	0.03	0.04
50	0.044	0.154	0.358	0.095	0.154	0.929	0.767	0.048	0.04	0.03
	0.045	0.138	0.325	0.084	0.138	0.928	0.739	0.048	0.03	0.04

Table 4.6 Power of Sequential Tests for Gamma Distribution, β= 1 (α= 0.1)

Sample Size	Beta(2,2) Power	Beta(2,3) Power	Uniform(0,2) Power	Normal(0,1) Power	Weibull(2,1) Power	Lognorm(0,1) Power	XLogistic(0,1) Power	Significance Level Attained	$\sqrt{b_1}$ test	b_2 test
5	0.203	0.156	0.203	0.215	0.138	0.133	0.291	0.100	0.09	0.02
	0.171	0.135	0.189	0.179	0.118	0.126	0.279	0.100	0.06	0.07
	0.098	0.084	0.128	0.095	0.075	0.135	0.303	0.099	0.02	0.09
15	0.760	0.549	0.768	0.709	0.383	0.204	0.506	0.101	0.10	0.01
	0.718	0.500	0.760	0.661	0.339	0.184	0.470	0.100	0.07	0.08
	0.608	0.391	0.690	0.553	0.254	0.189	0.468	0.098	0.03	0.09
25	0.964	0.824	0.967	0.898	0.572	0.259	0.673	0.100	0.10	0.01
	0.950	0.778	0.964	0.871	0.516	0.232	0.628	0.101	0.07	0.09
	0.842	0.572	0.929	0.709	0.321	0.237	0.605	0.101	0.01	0.10
50	1	0.993	1	0.993	0.826	0.371	0.879	0.100	0.10	0.01
	1	0.992	1	0.992	0.815	0.357	0.870	0.101	0.09	0.08
	0.999	0.949	1	0.961	0.603	0.331	0.819	0.100	0.01	0.10

Table 4.7 Power of Sequential Tests for Gamma Distribution, β= 1 (α= 0.1)

Sample Size	Gamma(1,1) Power	Gamma(2,1) Power	Gamma(3.5,1) Power	$\chi^2(1)$ Power	$\chi^2(4)$ Power	XCauchy(0,1) Power	XdblExp Power	Significance Level Attained	$\sqrt{b_1}$ test	b_2 test
5	0.102	0.104	0.118	0.154	0.104	0.472	0.250	0.100	0.09	0.02
	0.100	0.096	0.103	0.154	0.096	0.460	0.233	0.100	0.06	0.07
	0.102	0.076	0.071	0.173	0.076	0.473	0.246	0.099	0.02	0.09
15	0.099	0.158	0.248	0.144	0.158	0.794	0.479	0.101	0.10	0.01
	0.100	0.142	0.218	0.132	0.142	0.774	0.446	0.100	0.07	0.08
	0.099	0.114	0.16	0.139	0.114	0.769	0.444	0.098	0.03	0.09
25	0.102	0.197	0.338	0.162	0.197	0.913	0.644	0.100	0.10	0.01
	0.100	0.175	0.295	0.144	0.175	0.903	0.603	0.101	0.07	0.09
	0.099	0.126	0.180	0.152	0.126	0.894	0.584	0.101	0.01	0.10
50	0.101	0.261	0.496	0.193	0.261	0.933	0.857	0.100	0.10	0.01
	0.102	0.251	0.481	0.182	0.251	0.932	0.848	0.101	0.09	0.08
	0.101	0.170	0.299	0.163	0.170	0.929	0.802	0.100	0.01	0.10

with the same shape parameter. The power of percentage of rejections of the null hypothesis is very close to the significance level of the tests regardless of sample size, as expected. For instances, the power of gamma (1,1) is close to the 0.05 significance level. We also see this with $\beta = 3.5$. For the $\chi^2(1)$ alternative, the shape is similar to gamma with 0.5 shape. Thus, our expectation that the power of the $\chi^2(1)$ distribution wouldn't reveal much better power than the significance level was confirmed.

Power Results for Shape Parameter β = 3.5. The power results for shape $\beta = 3.5$ are shown in Table 4.8 to Table 4.11. When null hypothesis distributions differ greatly from all of the alternatives in shape, with the exception of gamma (β = 1 and 2) and $\chi^2(4)$ distributions, the sequential test shows good power with results following a parallel trend to the shape parameter $\beta = 1$. However, for those alternatives which have relationships with the null distribution which do not differ greatly in shape, such as gamma and $\chi^2(4)$, the power of the sequential test revealed relatively lower power. The sequential test power for Weibull distribution with shape $\beta = 2$ recorded fairly low power, unlike with shape $\beta = 1$. This is not surprising. It can be explained by the comparison of the third moment. For a Weibull distribution, the sequential power depends on skewness much more than kurtosis as shown on the power comparison plot of individual skewness and kurtosis. The difference of skewness value between null hypothesis and Weibull distribution (β =2) is not large as noted on skewness Table 3.5. Consequently, the power against Weibull distribution turned out to be relatively low.

4.4.1.2 Individual Two-tailed Skewness and Kurtosis Test Power. The objective of this power study is first to help quantify which tests were most powerful against specific alternatives to gain insight into selecting the appropriate combinations of significance levels to get better power when used sequentially. Second, it is also very useful to understand the behavior of the sequential test power as compared to individual two-tailed test power. Appendix F shows the power compar-

Table 4.8 Power of Sequential Tests for Gamma Distribution, β= 3.5 (α = 0.05)

Sample	Beta(2,2)	Beta(2,3)	Uniform(0,2)	Normal(0,1)	Weibull(2,1)	Lognorm(0,1)	XLogistic(0,1)	Significance Level		
Size	Power	Power	Power	Power	Power	Power	Power	Attained	$\sqrt{b_1}$ test	b_2 test
5	0.062	0.053	0.080	0.066	0.050	0.138	0.324	0.050	0.04	0.02
	0.052	0.048	0.075	0.051	0.047	0.137	0.317	0.048	0.02	0.04
15	0.206	0.096	0.270	0.241	0.060	0.287	0.636	0.050	0.04	0.02
	0.162	0.084	0.268	0.181	0.055	0.250	0.562	0.050	0.02	0.04
25	0.428	0.174	0.567	0.422	0.078	0.422	0.826	0.049	0.04	0.02
	0.361	0.150	0.585	0.339	0.067	0.351	0.760	0.050	0.02	0.04
50	0.862	0.426	0.931	0.754	0.128	0.691	0.980	0.052	0.05	0.01
	0.845	0.409	0.964	0.696	0.115	0.617	0.968	0.051	0.03	0.04

Table 4.9 Power of Sequential Tests for Gamma Distribution, β= 3.5 (α = 0.05)

Sample	Gamma(1,1)	Gamma(2,1)	Gamma(3.5,1)	$\chi^2(1)$	$\chi^2(4)$	XCauchy(0,1)	XdblExp	Significance Level		
Size	Power	Power	Power	Power	Power	Power	Power	Attained	$\sqrt{b_1}$ test	b_2 test
5	0.092	0.059	0.050	0.178	0.059	0.488	0.262	0.050	0.04	0.02
	0.094	0.060	0.044	0.177	0.060	0.482	0.255	0.048	0.02	0.04
15	0.118	0.061	0.052	0.244	0.061	0.854	0.589	0.050	0.04	0.02
	0.108	0.064	0.052	0.201	0.064	0.820	0.528	0.050	0.02	0.04
25	0.150	0.065	0.051	0.344	0.065	0.942	0.789	0.049	0.04	0.02
	0.122	0.066	0.051	0.261	0.066	0.931	0.728	0.050	0.02	0.04
50	0.249	0.083	0.052	0.577	0.083	0.935	0.968	0.052	0.05	0.01
	0.186	0.069	0.050	0.473	0.069	0.935	0.953	0.051	0.03	0.04

Table 4.10 Power of Sequential Tests for Gamma Distribution, β= 3.5 (α = 0.1)

Sample Size	Beta(2,2) Power	Beta(2,3) Power	Uniform(0,2) Power	Normal(0,1) Power	Weibull(2,1) Power	Lognorm(0,1) Power	XLogistic(0,1) Power	Significance Level Attained	Significance Level $\sqrt{b_1}$ test	Significance Level b_2 test
5	0.120	0.101	0.135	0.129	0.098	0.214	0.405	0.100	0.09	0.02
	0.123	0.105	0.148	0.123	0.101	0.208	0.395	0.100	0.07	0.06
	0.087	0.089	0.123	0.077	0.091	0.236	0.423	0.100	0.01	0.10
15	0.336	0.172	0.390	0.355	0.113	0.402	0.743	0.099	0.09	0.02
	0.342	0.186	0.454	0.333	0.119	0.370	0.711	0.101	0.07	0.06
	0.231	0.140	0.389	0.208	0.097	0.339	0.635	0.100	0.02	0.09
25	0.600	0.288	0.702	0.552	0.145	0.555	0.901	0.101	0.09	0.03
	0.560	0.276	0.749	0.477	0.137	0.472	0.850	0.101	0.05	0.08
	0.456	0.227	0.718	0.365	0.114	0.451	0.810	0.099	0.02	0.09
50	0.934	0.577	0.959	0.833	0.211	0.795	0.992	0.101	0.10	0.01
	0.936	0.584	0.985	0.812	0.206	0.764	0.989	0.098	0.08	0.06
	0.849	0.479	0.986	0.592	0.152	0.652	0.962	0.102	0.01	0.10

Table 4.11 Power of Sequential Tests for Gamma Distribution, β= 3.5 (α= 0.1)

Sample Size	Gamma(1,1) Power	Gamma(2,1) Power	Gamma(3.5,1) Power	$\chi^2(1)$ Power	$\chi^2(4)$ Power	XCauchy(0,1) Power	XdblExp Power	Significance Level Attained	Significance Level $\sqrt{b_1}$ test	Significance Level b_2 test
5	0.152	0.109	0.100	0.255	0.109	0.544	0.341	0.100	0.09	0.02
	0.154	0.112	0.101	0.254	0.112	0.537	0.328	0.100	0.07	0.06
	0.178	0.121	0.101	0.286	0.121	0.554	0.349	0.100	0.01	0.10
15	0.203	0.114	0.101	0.373	0.114	0.889	0.688	0.099	0.09	0.02
	0.186	0.115	0.102	0.335	0.115	0.879	0.659	0.101	0.07	0.06
	0.186	0.126	0.103	0.289	0.126	0.847	0.601	0.100	0.02	0.09
25	0.256	0.127	0.102	0.498	0.127	0.952	0.863	0.101	0.09	0.03
	0.204	0.119	0.103	0.395	0.119	0.945	0.814	0.101	0.05	0.08
	0.205	0.126	0.100	0.363	0.126	0.939	0.784	0.099	0.02	0.09
50	0.377	0.148	0.100	0.731	0.148	0.935	0.984	0.101	0.10	0.01
	0.335	0.135	0.098	0.682	0.135	0.935	0.979	0.098	0.08	0.06
	0.259	0.135	0.102	0.505	0.135	0.935	0.952	0.102	0.01	0.10

ison between the sequential test and individual test. The power results for the separate skewness and kurtosis tests are also given in Appendix G.

Four distinct patterns can be observed in the power comparison plots appearing in this thesis:

1. The sequential test power was bounded by the individual test power, which was observed most frequently through all shape parameters ($\beta = 0.5$ to 4). The skewness test dominates the kurtosis test in terms of power. Since the skewness test is more powerful in this case choosing a higher significance level for the skewness test and a correspondingly lower level for the kurtosis test, will yield higher power, while picking a higher level for the weaker kurtosis test results in lower power at the same overall significance level. As shown in Figure 4.8, the power of the sequential test lies between the individual skewness and kurtosis test power. The jagged line indicates the sequential test power and shows a considerable fluctuation pattern depending on the combinations of significance levels chosen (Case I).

2. Another case is when the sequential test power seemed to dip below that of both component tests as shown in Figure 4.9. Those cases are found in the plots, transformed logistic for $\beta =$ 0.5, lognormal, transformed double exponential, $\chi^2(1)$, transformed logistic, and transformed Cauchy for $\beta = 1$, and gamma, $\chi^2(1)$, $\chi^2(4)$, lognormal, transformed logistic, transformed double exponential, and transformed Cauchy for $\beta = 3.5$. However, upon closer examination of the results, for a given attained significance level, the sequential test power still lies between the two component test powers. Actually, the sequential test power is not less than the lower test power of the two components. These cases were more a result of the variability in the third decimal place of the power estimates rather than indicating any real significant reduction in power (Case II).

3. The other cases, such as beta, uniform, and Weibull for shape $\beta = 3.5$, are when the sequential test power exceeds that of both the tests, which, in fact, was observed rarely during these power studies. A representative case is given as an example in Figure 4.10; because of a

particularly effective complementary relationship between the tests. Of course, in the most ideal case, we would like to observe this often. However, it is possible when only both tests show good power against specific alternative distributions (Case III).

4. Finally, in most cases skewness test power is higher than kurtosis as in case I. However, there are cases when the kurtosis test power dominates the skewness test power as shown in Figure 4.9. These are found in the plots, $\chi^2(1)$ and transformed logistic for $\beta = 1$ and uniform, gamma($\beta = 1$ and 2), $\chi^2(\nu = 1$ and 4), transformed logistic, transformed double exponential, and transformed Cauchy for $\beta = 3.5$. These observations start from shape parameter, $\beta = 1$. Then, as β increases, the number of the observations get larger. These findings give us valuable insights. Kurtosis becomes more of a discriminator against similarly shaped alternatives, while, for lower shape parameters (e.g. shape $\beta = 0.5$), skewness becomes more of a discriminator. For those distributions, a higher significance level for kurtosis test and a lower level for skewness will guarantee better power results. In addition, one other observation found is that the kurtosis test for these cases enumerated above does not necessarily remain most powerful any more as sample sizes increase. This might imply that the kurtosis test is more powerful at smaller sample sizes. However, as sample sizes increase, the skewness test becomes dominant. Thus, each component test of the sequential test for the gamma distribution works well by compensating each other over small and large sample sizes. Consequently, both tests provide on average, good power over a broad range of alternatives (Case IV).

Through the examination of power comparison plots, we have gained some insights which are summarized as follows: As the shape parameter changes, the skewness and kurtosis tests each have their own particular strengths. The dominant component varies with the shape parameters and the skewness test shows superiority with small shape parameter and large sample sizes, while the kurtosis test outperforms the skewness test at small sample sizes and large shape parameters. Over all sample sizes, the average power of the sequential test is maintained by compensation

of both tests. As shown in case I, normally, the sequential test power is lower than in its best component test. The complementary nature of the two tests working together normally prevents the sequential test power from slipping below that of the weaker test. By picking the right combination of significance levels, one can improve the sequential power to the point that it is nearly equivalent with the best component power. In some cases, it exceeds the two tests, as stated above, by complementary effects. In the critical value observations as mentioned earlier, the predictions that the characteristic of a much narrower range of the skewness critical value along with rapid convergence, would make the skewness test more powerful was confirmed from the power comparison plots. Particularly, the skewness test is useful in distinguishing among skewed alternatives as found in the plots for $\beta = 0.5$, and the kurtosis test becomes useful when the alternatives are nearly symmetric or very similarly skewed. To explore the behavior of the sequential test, a one-tailed test was conducted and the results will be discussed in the following section.

4.4.1.3 Directional One-tailed Skewness and Kurtosis Test Power. Power comparison plots not only enabled us to observe the behavior of the sequential test power and the individual test power measurements effectively, but also facilitated combining the significance levels of each component test to achieve the highest sequential power among potential combinations. In this section, where one has some specific prior knowledge about an alternative distribution, or when one has the necessary time to collect some information for a particular alternative, we expect the one-tailed test to show improved power performance against that of the two-tailed test. Since it is true that the wider rejection region of a one-tailed test will enhance power. To check this assumption, a one-tailed test was performed for a small set of alternatives as noted in Tables 3.7 and 3.8 in the prededing chapter. The power results can be found in Appendix H.

In the process of these one-tailed power studies, there is an important consideration that we had to make. The strategy we employed in selecting a tail to be tested for each alternative was based on the skewness or kurtosis values that determine a shape of a specific alternative

distribution. In fact, the tailedness, where tailedness indicates selection of upper or lower tail, of a test was chosen by comparison of the theoretical sample skewness and kurtosis displayed in the Table 3.5. For example, the theoretical sample kurtosis values are 1.720 and 2.143 for the hypothesized null distribution, gamma (3.5,1) and alternative beta (2,2) respectively. The kurtosis of the beta alternative is bigger than that of the null distribution. Thus, an upper tail test should be chosen in this case. The principle, however, didn't always work for beta (2,2) and uniform (0,2) alternatives with the gamma (3.5,1) null distribution. It is because the sample sizes used to get the sample skewness and kurtosis by random number of generation of *MATLAB* were on the order of five million, while the sample sizes that have been used for the power study were 5, 15, 25, and 50. As a result, additional research is required to determine which tail should be used by the comparison of a sample skewness and kurtosis values for those alternative distributions. For all given sample size cases, the kurtosis value for these two alternative distributions was obtained using *MATLAB*. None of these kurtosis values were bigger that that of the kurtosis values of the null hypothesis distribution for each sample size given. Therefore, in these particular cases, although an upper tail power study should be conducted by a comparison of theoretical sample kurtosis, a lower tail test had to be performed instead of upper tail test. Fortunately, there is an optional way to conduct this directional one-tailed power study correctly. Even though one doesn't have a precise idea about the third or fourth moment, one won't be tempted to conduct the one-tailed test with a wrong-sided test. In that sense, the directional one-tailed test is a very effective test. First option is to determine the appropriate tail to be tested in advance by comparison the moment values. Since the computation of the sample moment is a very simple job it can be done easily. Another option is that, without computing moments, one simply conducts the one-tailed test twice for each side test. Then, he chooses the tail which produced the better power result. The tail chosen is the same tail that was selected at the first option. This makes the best contribution to the power of the sequential test, and it should be incorporated in the sequential test to give the best power. However, a drawback is accompanied with the second option. It is that conducting

Table 4.12 Directional Power for Lognormal(0,1) - H_0: Gamma(1,1); H_a: Lognorm(0,1)

Sample Size	Test Version	Significance Level				
		0.01	0.05	0.10	0.15	0.20
5	Two-tailed	0.019	0.074	0.136	0.190	0.242
	One-tailed	0.026	0.096	0.165	0.227	0.285
15	Two-tailed	0.059	0.136	0.204	0.262	0.318
	One-tailed	0.080	0.183	0.273	0.347	0.412
25	Two-tailed	0.085	0.176	0.259	0.323	0.378
	One-tailed	0.111	0.244	0.348	0.430	0.499
50	Two-tailed	0.134	0.270	0.371	0.443	0.499
	One-tailed	0.179	0.366	0.486	0.571	0.638

multiple tests brings about Type I error inflated. Therefore, prior knowledge is critical condition for the directional one-tailed test.

As we expected, the power of one-tailed tests improved. For small sample sizes such as $n = 5$ and 15, the power improved by twice as much. For the other sample sizes, there was an approximately 20% increase. Specifically, the power comparison was performed for a lognormal alternative which had showed power weaker than expected. The expectation was that the power of the sequential test by using the original two-tailed skewness test would be very effective in distinguishing itself from the alternative based on the true skewness values of the two distributions (gamma (1,1): 1.635 , lognormal (0,1): 6.184). One-tailed skewness test with the appropriate upper tail chosen demonstrated remarkably, improved power by more than 30 - 40% at a significance level, $\alpha = 0.05$. The power results for directional one-tailed test for the lognormal distribution are shown in Table 4.12.

For the beta (2,2) alternative with significance level $\alpha = 0.05$, the degree of power for the one-sided version climbs to about 42% for sample size $n = 5$ and 140 - 176% for larger samples (Table 4.13).

In conclusion, when an appropriate one-tailed test was applied the power increased in general as expected, and in some cases, dramatically so.

Table 4.13 Directional Power for Beta(2,2) - H_0: Gamma(1,1); H_a: Beta(2,2)

Sample Size	Test Version	Significance Level 0.01	0.05	0.10	0.15	0.20
5	Two-tailed	0.009	0.043	0.086	0.132	0.179
	One-tailed	0.012	0.061	0.124	0.183	0.241
15	Two-tailed	0.015	0.073	0.140	0.200	0.258
	One-tailed	0.030	0.139	0.256	0.357	0.449
25	Two-tailed	0.036	0.145	0.259	0.352	0.433
	One-tailed	0.065	0.259	0.433	0.571	0.678
50	Two-tailed	0.168	0.461	0.659	0.775	0.847
	One-tailed	0.266	0.659	0.847	0.926	0.963

Finally, some directional variants of the sequential test incorporated by taking advantage of the one-sided version will be discussed in the next section.

4.4.1.4 Directional variants of the Sequential Test. As the one-tailed tests demonstrated higher power, it is logical to expect that directional variants of the sequential tests employing a one-sided version will reveal better power. One thing to consider in conducting the directional variants of the sequential test is to reevaluate new attained significance levels. The coding scheme modification required to obtain such significance levels is straight forward. It is simply a matter of replacing the original two-tailed component tests with their corresponding one-tailed skewness or kurtosis test respectively. The rest of the modifications for a power study are almost identical to those accomplished with the power study of the original sequential test. Given these facts, power studies on directional variants of the sequential test were conducted only for the gamma ($\beta = 1$) null hypothesis against the lognormal alternative distribution used in the previous section. The power studies were made up of three different combinations along with the new significance levels. First, the combination of an upper-tail skewness test (one-tailed) and an original kurtosis test (two-tailed), Second, the combination of an original skewness test (two-tailed) and an upper-tail kurtosis test (one-tailed), and an upper-tail skewness and an upper-tail kurtosis (one-tailed for both test) is the third combination. These results were compared to the power of the original two-tailed sequential test. Note, that as already used on the power study of a directional one-tailed test, the upper-tail was chosen based on the higher theoretical moment of the null distribution under the

Table 4.14 Power of Directional variants of the Sequential Test - H_0: Gamma(1,1), H_a: Lognorm(0,1)

	Sequential Test Variants, $\alpha = 0.05$				
	$\sqrt{b_1}$ Test	Both Tail	Up tail	Both Tail	Up tail
	b_2 Test	Both Tail	Both Tail	Up tail	Up tail
Size (n)	5	0.07	0.089	0.086	0.097
	15	0.123(.049)	0.164	0.158	0.183
	25	0.159(.051)	0.218	0.198	0.245
	50	0.249(.052)	0.334	0.292	0.366

assumption that one has prior information on the lognormal alternative. The power results of these modified directional variants of the sequential tests are shown in Table 4.14.

It should also be noted that in tabling these directional variants of the sequential test, the highest power among the full range of power for all potential combinations of attained significance levels was selected. An attained significance level, 0.05, was maintained as close as possible. Attained significance levels other than $\alpha = 0.05$ were specified in the parenthesis as shown in Table 4.14

The power of the sequential test variants with the one-tailed skewness when employed in place of the two-tailed skewness test improved as much as 27.1 - 37.1%, while the power with the one-tailed kurtosis increased 17.3 - 28.5%. As observed in the power comparison plot in Appendix F, the skewness test substantially contributed to the power. The gains of the sequential test variants with both one-tailed tests resulted in significantly better power than the sequential test with the original two-tailed versions. Hence, on making this sequential goodness of fit test, if analysts have a specific knowledge or can obtain necessary information that is needed for using directional versions of the skewness and/or the kurtosis test in the sequential format, he or she can improve power to a considerable degree.

4.4.2 Comparative Power Study: Woodruff Alternatives. The ten alternative distributions were restated as follows:

1. Gamma (1.5,1)

2. Gamma (2.5,1)

3. Gamma (4,1)

4. Weibull (2,1)

5. Weibull (3,1)

6. Normal (0,1)

7. Lognormal (0,1)

8. Lognormal (0,2)

9. Uniform (0,2)

10. Beta (2,2)

For convenient use of power tables, note that to compare the power of the sequential test with that of Woodruff alternatives, each of the tables indicates the power for the sequential test for three different combinations of significance levels for skewness and kurtosis tests. These yield an attained significance level as close as possible to the $\alpha = 0.05$ used by Woodruff et al. The same set of α-level combinations are repeated for each alternative. When comparing the power, note that the sequential power for each combination of individual significance levels needs to be compared to all three of the EDF powers. In other words, the sequential power shouldn't be restricted to the comparison of those powers that are lined up horizontally.

4.4.2.1 **Power Results for Shape Parameter $\beta = 1.5$.** The null hypothesis with gamma shape $\beta = 1.5$ is considered first. Tables 4.15 to 4.24 show the powers of the competing tests at the $\alpha = .05$ significance level for each of the ten alternative distributions. In general, admirable performance was achieved. For the beta alternatives, the power of the sequential test is considerably higher than the prominent EDF competitors, showing quite substantial dominance over all sample sizes. Another remarkable performance was observed in the case of the uniform alternative for every sample size. The sequential power against Weibull and normal alternatives

Table 4.15 Power Comparisons for Sequential Test - H_0: Gamma(1.5,1); H_a: Beta(2,2)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level		
				$\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.017	0.088	0.04	0.02	0.050
	CvM	0.034	0.098	0.05	0.01	0.055
	K-S	0.045	0.061	0.02	0.04	0.049
15	A-D	0.234	0.447	0.04	0.02	0.049
	CvM	0.304	0.479	0.05	0.01	0.054
	K-S	0.245	0.364	0.02	0.04	0.049
25	A-D	0.566	0.779	0.04	0.03	0.048
	CvM	0.636	0.800	0.05	0.01	0.052
	K-S	0.515	0.743	0.03	0.04	0.049

Table 4.16 Power Comparisons for Sequential Test - H_0: Gamma(1.5,1); H_a: Uniform(0,2)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level		
				$\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.020	0.100	0.04	0.02	0.050
	CvM	0.041	0.106	0.05	0.01	0.055
	K-S	0.047	0.082	0.02	0.04	0.049
	A-D	0.184	0.486	0.04	0.02	0.049
	CvM	0.226	0.502	0.05	0.01	0.054
	K-S	0.181	0.446	0.02	0.04	0.049
25	A-D	0.413	0.824	0.04	0.03	0.048
	CvM	0.460	0.817	0.05	0.01	0.052
	K-S	0.361	0.814	0.03	0.04	0.049

exceeded the power of the EDF tests for smaller sample size (5 and 15). The power of the sequential test is, however, marginally low for sample size 25. Yet for the lognormal alternatives, this test did not fare so well. Note that although the powers are low relative to EDF tests over every sample size, the powers of the sequential test still show acceptable power. When paired with the gamma alternatives, the sequential test shows superiority for smaller sample sizes (5 and 15); however, the gap of power with EDF tests gets bigger as sample size increases. The power table against gamma shape $\beta = 1.5$ represents the verification run, as noted earlier, which strongly supports the assumption that all computer coding conducted are accurate and valid.

Table 4.17 Power Comparisons for Sequential Test - H_0: Gamma(1.5,1); H_a: Normal(0,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.015	0.092	0.04	0.02	0.050
	CvM	0.038	0.108	0.05	0.01	0.055
	K-S	0.050	0.063	0.02	0.04	0.049
15	A-D	0.377	0.447	0.04	0.02	0.049
	CvM	0.453	0.479	0.05	0.01	0.054
	K-S	0.387	0.367	0.02	0.04	0.049
25	A-D	0.743	0.697	0.04	0.03	0.048
	CvM	0.797	0.723	0.05	0.01	0.052
	K-S	0.726	0.662	0.03	0.04	0.049

Table 4.18 Power Comparisons for Sequential Test - H_0: Gamma(1.5,1); H_a: Weibull(2,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.017	0.059	0.04	0.02	0.050
	CvM	0.028	0.065	0.05	0.01	0.055
	K-S	0.034	0.046	0.02	0.04	0.049
15	A-D	0.093	0.154	0.04	0.02	0.049
	CvM	0.145	0.172	0.05	0.01	0.054
	K-S	0.123	0.119	0.02	0.04	0.049
25	A-D	0.247	0.253	0.04	0.03	0.048
	CvM	0.313	0.279	0.05	0.01	0.052
	K-S	0.275	0.223	0.03	0.04	0.049

4.4.2.2 **Power Results for Shape Parameter $\beta = 4$.** With shape $\beta = 4$ in the null hypothesis, overall power results are different although similar trends are found. Tables 4.25 to 4.34 show the powers of the competing tests at the $\alpha = .05$ significance level for each alternate distribution. Both EDF and the sequential test reveal slightly decreased power, as compared to the power of shape $\beta = 1.5$ over all alternatives. This is because as shape increases, the skewness test lose its strength, while the kurtkosis puts forth its strength. Recall that as observed in the power comparison plots, the skewness teest dominates the kurtosis test in most cases. However, the work of the sequential procedure against a competitor is still notable. For beta alternatives, similar findings are observed with shape $\beta = 1.5$. Over every sample size, the sequential test performed consistently higher. Against the uniform alternative, the sequential test exhibits outstanding performance. The sequential test power against Weibull and normal alternatives surpassed the power of the EDF

Table 4.19 Power Comparisons for Sequential Test - H_0: Gamma(1.5,1); H_a: Weibull(3,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.015	0.082	0.04	0.02	0.050
	CvM	0.030	0.092	0.05	0.01	0.055
	K-S	0.040	0.058	0.02	0.04	0.049
15	A-D	0.280	0.361	0.04	0.02	0.049
	CvM	0.351	0.393	0.05	0.01	0.054
	K-S	0.290	0.285	0.02	0.04	0.049
25	A-D	0.628	0.607	0.04	0.03	0.048
	CvM	0.685	0.639	0.05	0.01	0.052
	K-S	0.607	0.564	0.03	0.04	0.049

Table 4.20 Power Comparisons for Sequential Test - H_0: Gamma(1.5,1); H_a: Lognormal(0,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.122	0.096	0.04	0.02	0.050
	CvM	0.118	0.105	0.05	0.01	0.055
	K-S	0.114	0.099	0.02	0.04	0.049
15	A-D	0.307	0.167	0.04	0.02	0.049
	CvM	0.295	0.184	0.05	0.01	0.054
	K-S	0.252	0.159	0.02	0.04	0.049
25	A-D	0.444	0.227	0.04	0.03	0.048
	CvM	0.442	0.251	0.05	0.01	0.052
	K-S	0.390	0.209	0.03	0.04	0.049

tests for the smallest sample size ($n = 5$). The power of the sequential test, however, matched or slightly exceeded EDF's in the bigger sample size (15 and 25). When paired with the conventional test for the lognormal alternatives, this test failed to surpass the power of the EDF test. Again, the power itself is substantially high, correctly rejecting 84% for sample size n=25, which proves that this test against lognormal alternatives is powerful. The sequential test exhibits lower power than the EDF test in cases of the gamma alternatives. However, as shape increases to 2.5, the gap was closed considerably. Again, the power table against gamma shape $\beta = 4$ is good evidence that the coding used is valid and accurate.

Table 4.21 Power Comparisons for Sequential Test - H_0: Gamma(1.5,1); H_a: Lognormal(0,2)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.412	0.291	0.04	0.02	0.050
	CvM	0.405	0.304	0.05	0.01	0.055
	K-S	0.383	0.294	0.02	0.04	0.049
15	A-D	0.928	0.466	0.04	0.02	0.049
	CvM	0.909	0.490	0.05	0.01	0.054
	K-S	0.873	0.429	0.02	0.04	0.049
25	A-D	0.995	0.628	0.04	0.03	0.048
	CvM	0.991	0.660	0.05	0.01	0.052
	K-S	0.995	0.592	0.03	0.04	0.049

Table 4.22 Power Comparisons for Sequential Test - H_0: Gamma(1.5,1); H_a: Gamma(1.5,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.049	0.050	0.04	0.02	0.050
	CvM	0.047	0.056	0.05	0.01	0.055
	K-S	0.051	0.051	0.02	0.04	0.049
15	A-D	0.045	0.048	0.04	0.02	0.049
	CvM	0.047	0.053	0.05	0.01	0.054
	K-S	0.046	0.051	0.02	0.04	0.049
25	A-D	0.044	0.050	0.04	0.03	0.048
	CvM	0.051	0.054	0.05	0.01	0.052
	K-S	0.057	0.051	0.03	0.04	0.049

Table 4.23 Power Comparisons for Sequential Test - H_0: Gamma(1.5,1); H_a: Gamma(2.5,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.030	0.049	0.04	0.02	0.050
	CvM	0.036	0.056	0.05	0.01	0.055
	K-S	0.044	0.044	0.02	0.04	0.049
15	A-D	0.037	0.064	0.04	0.02	0.049
	CvM	0.056	0.071	0.05	0.01	0.054
	K-S	0.053	0.055	0.02	0.04	0.049
25	A-D	0.070	0.078	0.04	0.03	0.048
	CvM	0.099	0.085	0.05	0.01	0.052
	K-S	0.097	0.072	0.03	0.04	0.049

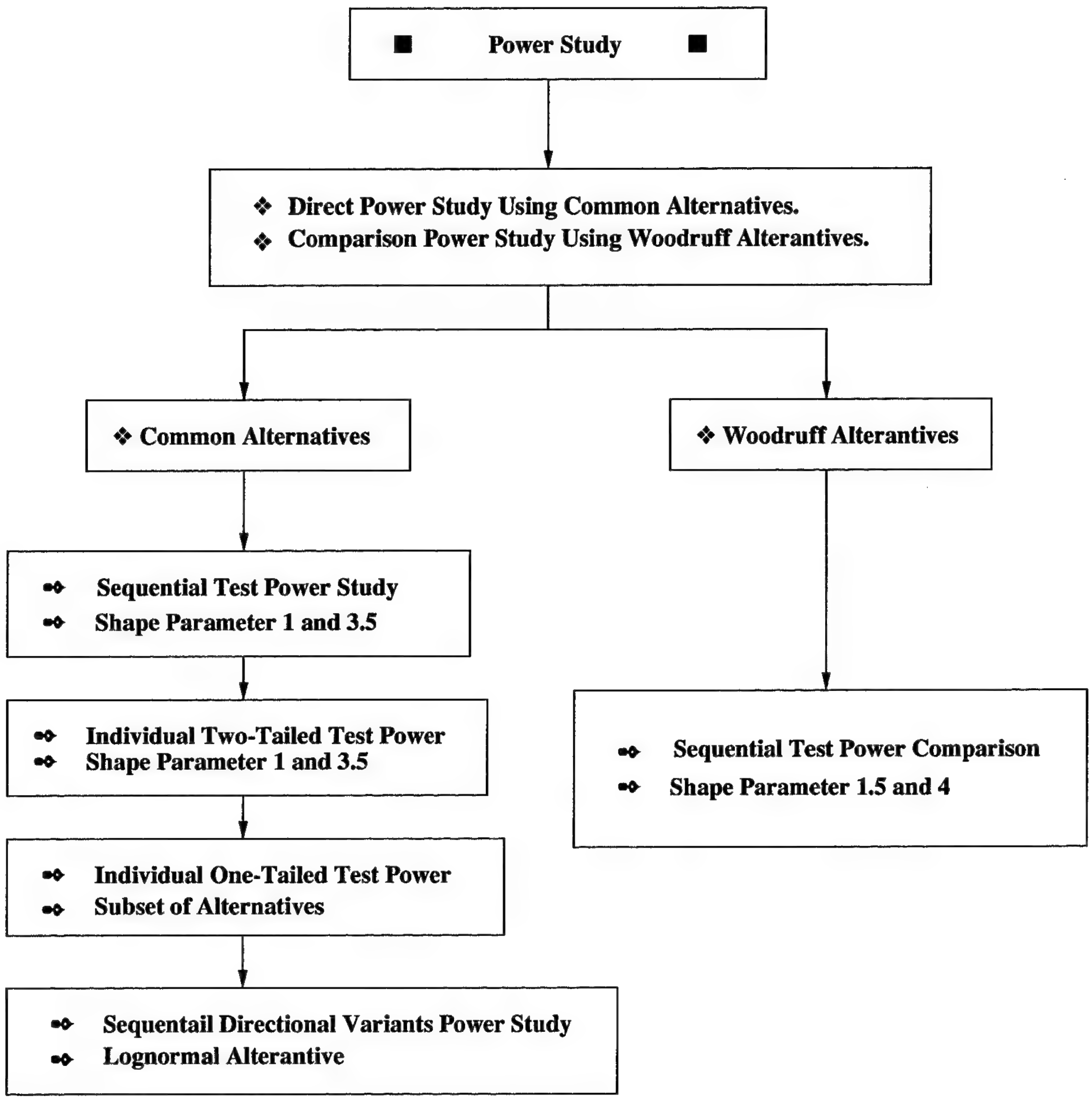


Figure 4.7 Power Study Outline

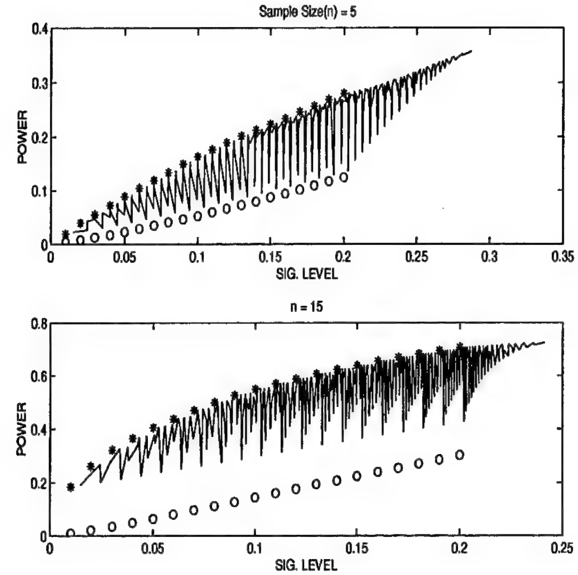


Figure 4.8 Power Comparison - H_0: Gamma(1,1); H_a: Beta(2,3)

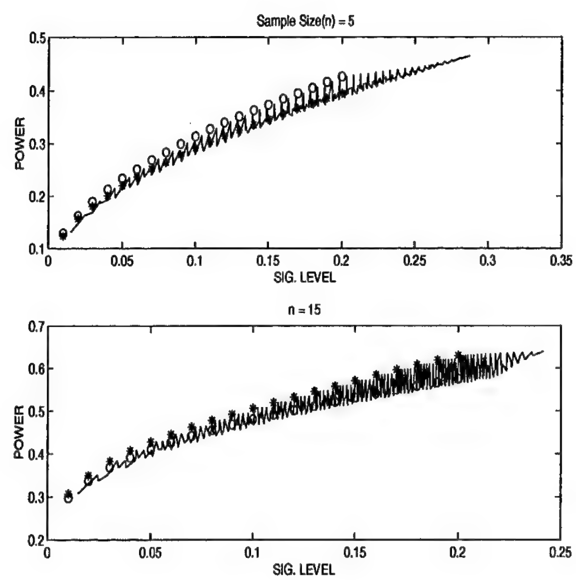


Figure 4.9 Power Comparison - H_0: Gamma(1,1); H_a: XLogistic(0,1)

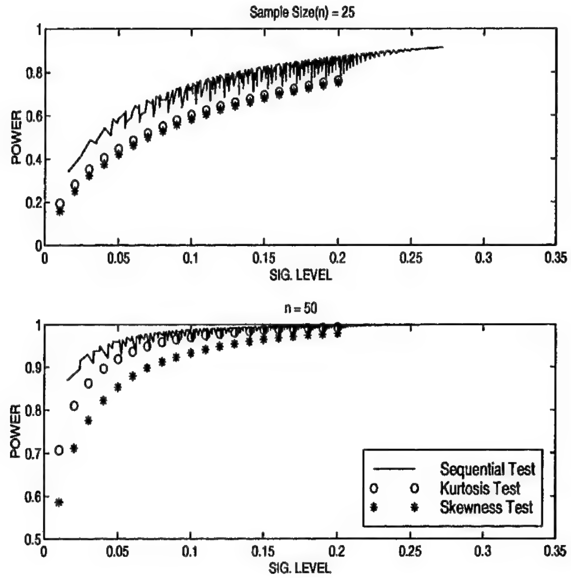


Figure 4.10 Power Comparison - H_0: Gamma(3.5,1); H_a: Uniform(0,2)

Table 4.24 Power Comparisons for Sequential Test - H_0: Gamma(1.5,1); H_a: Gamma(4,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.026	0.054	0.04	0.02	0.050
	CvM	0.034	0.060	0.05	0.01	0.055
	K-S	0.042	0.045	0.02	0.04	0.049
15	A-D	0.069	0.096	0.04	0.02	0.049
	CvM	0.101	0.109	0.05	0.01	0.054
	K-S	0.093	0.075	0.02	0.04	0.049
25	A-D	0.175	0.136	0.04	0.03	0.048
	CvM	0.228	0.152	0.05	0.01	0.052
	K-S	0.197	0.122	0.03	0.04	0.049

Table 4.25 Power Comparisons for Sequential Test - H_0: Gamma(4,1); H_a: Beta(2,2)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.044	0.060	0.04	0.02	0.050
	CvM	0.054	0.060	0.03	0.04	0.052
	K-S	0.055	0.050	0.02	0.04	0.047
15	A-D	0.117	0.185	0.04	0.02	0.050
	CvM	0.131	0.168	0.03	0.03	0.047
	K-S	0.112	0.148	0.02	0.04	0.050
25	A-D	0.204	0.370	0.04	0.02	0.048
	CvM	0.211	0.390	0.05	0.01	0.055
	K-S	0.058	0.318	0.02	0.04	0.050

Table 4.26 Power Comparisons for Sequential Test - H_0: Gamma(4,1); H_a: Uniform(0,2)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.053	0.077	0.04	0.02	0.050
	CvM	0.065	0.083	0.03	0.04	0.052
	K-S	0.061	0.073	0.02	0.04	0.047
15	A-D	0.163	0.249	0.04	0.02	0.050
	CvM	0.162	0.253	0.03	0.03	0.047
	K-S	0.129	0.255	0.02	0.04	0.050
25	A-D	0.296	0.534	0.04	0.02	0.048
	CvM	0.269	0.553	0.03	0.03	0.046
	K-S	0.198	0.562	0.02	0.04	0.050

Table 4.27 Power Comparisons for Sequential Test - H_0: Gamma(4,1); H_a: Normal(0,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.047	0.062	0.04	0.02	0.050
	CvM	0.058	0.060	0.03	0.04	0.052
	K-S	0.057	0.048	0.02	0.04	0.047
15	A-D	0.197	0.222	0.04	0.02	0.050
	CvM	0.210	0.195	0.03	0.03	0.047
	K-S	0.173	0.166	0.02	0.04	0.050
25	A-D	0.368	0.376	0.04	0.02	0.048
	CvM	0.375	0.406	0.05	0.01	0.055
	K-S	0.155	0.300	0.02	0.04	0.050

Table 4.28 Power Comparisons for Sequential Test - H_0: Gamma(4,1); H_a: Weibull(2,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.042	0.050	0.04	0.02	0.050
	CvM	0.045	0.052	0.03	0.04	0.052
	K-S	0.047	0.046	0.02	0.04	0.047
15	A-D	0.050	0.055	0.04	0.02	0.050
	CvM	0.057	0.052	0.03	0.03	0.047
	K-S	0.054	0.052	0.02	0.04	0.050
25	A-D	0.054	0.065	0.04	0.02	0.048
	CvM	0.063	0.068	0.05	0.01	0.055
	K-S	0.063	0.060	0.02	0.04	0.050

Table 4.29 Power Comparisons for Sequential Test - H_0: Gamma(4,1); H_a: Weibull(3,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.040	0.058	0.04	0.02	0.050
	CvM	0.050	0.056	0.03	0.04	0.052
	K-S	0.050	0.046	0.02	0.04	0.047
15	A-D	0.119	0.148	0.04	0.02	0.050
	CvM	0.133	0.130	0.03	0.03	0.047
	K-S	0.116	0.111	0.02	0.04	0.050
25	A-D	0.218	0.253	0.04	0.02	0.048
	CvM	0.230	0.279	0.05	0.01	0.055
	K-S	0.198	0.191	0.02	0.04	0.050

Table 4.30 Power Comparisons for Sequential Test - H_0: Gamma(4,1); H_a: Lognormal(0,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.175	0.142	0.04	0.02	0.050
	CvM	0.158	0.142	0.03	0.04	0.052
	K-S	0.150	0.140	0.02	0.04	0.047
15	A-D	0.517	0.305	0.04	0.02	0.050
	CvM	0.481	0.279	0.03	0.03	0.047
	K-S	0.424	0.265	0.02	0.04	0.050
25	A-D	0.761	0.448	0.04	0.02	0.048
	CvM	0.728	0.482	0.05	0.01	0.055
	K-S	0.643	0.367	0.02	0.04	0.050

Table 4.31 Power Comparisons for Sequential Test - H_0: Gamma(4,1); H_a: Lognormal(0,2)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.489	0.367	0.04	0.02	0.050
	CvM	0.462	0.357	0.03	0.04	0.052
	K-S	0.439	0.356	0.02	0.04	0.047
15	A-D	0.963	0.665	0.04	0.02	0.050
	CvM	0.949	0.630	0.03	0.03	0.047
	K-S	0.915	0.580	0.02	0.04	0.050
25	A-D	0.999	0.847	0.04	0.02	0.048
	CvM	0.997	0.870	0.05	0.01	0.055
	K-S	0.993	0.773	0.02	0.04	0.050

Table 4.32 Power Comparisons for Sequential Test - H_0: Gamma(4,1); H_a: Gamma(1.5,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.078	0.067	0.04	0.02	0.050
	CvM	0.076	0.071	0.03	0.04	0.052
	K-S	0.075	0.067	0.02	0.04	0.047
15	A-D	0.147	0.087	0.04	0.02	0.050
	CvM	0.135	0.080	0.03	0.03	0.047
	K-S	0.117	0.087	0.02	0.04	0.050
25	A-D	0.226	0.100	0.04	0.02	0.048
	CvM	0.202	0.114	0.05	0.01	0.055
	K-S	0.177	0.088	0.02	0.04	0.050

Table 4.33 Power Comparisons for Sequential Test - H_0: Gamma(4,1); H_a: Gamma(2.5,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.063	0.054	0.04	0.02	0.050
	CvM	0.061	0.058	0.03	0.04	0.052
	K-S	0.061	0.054	0.02	0.04	0.047
15	A-D	0.064	0.055	0.04	0.02	0.050
	CvM	0.062	0.053	0.03	0.03	0.047
	K-S	0.060	0.060	0.02	0.04	0.050
25	A-D	0.075	0.060	0.04	0.02	0.048
	CvM	0.075	0.071	0.01	0.05	0.055
	K-S	0.072	0.060	0.02	0.04	0.050

Table 4.34 Power Comparisons for Sequential Test - H_0: Gamma(4,1); H_a: Gamma(4,1)

Sample Size	EDF Test	Woodruff's Power	Sequential Test Power	Significance Level $\sqrt{b_1}$ test	b_2 test	Attained
5	A-D	0.054	0.050	0.04	0.02	0.050
	CvM	0.055	0.055	0.03	0.04	0.052
	K-S	0.057	0.050	0.02	0.04	0.047
15	A-D	0.045	0.049	0.04	0.02	0.050
	CvM	0.051	0.046	0.03	0.03	0.047
	K-S	0.052	0.050	0.02	0.04	0.050
25	A-D	0.048	0.049	0.04	0.02	0.048
	CvM	0.051	0.054	0.01	0.05	0.055
	K-S	0.052	0.049	0.02	0.04	0.050

4.5 Verification and Validation

To increase the computer programs's credibility, numerous verification and validation techniques [4: 399-425] were used throughout this research effort.

4.5.1 Verification. "Verification is concerned with ***building a model right*** " [4: 399]. To assure that each model developed in this thesis was built correctly. the Monte Carlo simulation developed by previous students [12] was modified and debugged using *MATLAB Editor/Debugger.* For each program, a logic flow diagram that follows the model logic was first made. Then, according to the flow diagram, the basic program was built and gradually upgraded. In other words, each program started with the simplest code and was tested rigorously before another level of complexity was added to the program. Then, a more complex program was developed. All input parameters for each null or alternative hypothesis employed in this thesis were closely examined and verified by deriving PDF in *MATLAB* and by comparing these to other PDF published already [41] [64] [78]. Brief comments in the model, definitions of all variables and parameters, and descriptions of each major section of the simulation coding were also added in Appendix I.1. Doing so would help readers understand the code easier. It will also facilitate them to modify the model in the future.

4.5.2 Validation. "Validation is concerned with ***building the right model*** ." namely, it is concerned with determining whether the model is an accurate representation of the real system [4: 400]. In this thesis, fortunately, several outputs for cross-check were available to support that the model built through the thesis was right. Specifically, for critical value generation, the critical values for gamma (1,1) should be exactly same with those of Weibull (1,1) since exponential distribution is special case of gamma and Weibull distribution with shape parameter (β) = 1 was made. This was proved by comparison with the critical values for Weibull (1,1) generated by Clough [12]. As a validation for power studies code, the power should be the same as the level of significance in the case that the null hypothesis and alternative distribution are the same. Such evidence was illustrated in both Tables 4.35 and 4.36. The power of the sequential test against true alternative

Table 4.35 Power of Sequential Tests - H_0: Gamma(1,1) vs. H_a: Gamma(1,1)

Null Distribution	Alternative Distribution	Sample Size	Sequential Power	Attained Level (0.050)	Sequential Power	Attained Level (0.100)
Gamma(1,1)	Gamma(1,1)	5	0.051	0.050	0.102	0.100
			0.051	0.050	0.100	0.100
					0.102	0.099
		15	0.047	0.049	0.099	0.101
			0.047	0.050	0.100	0.100
					0.099	0.098
		25	0.046	0.051	0.102	0.100
			0.046	0.051	0.100	0.101
					0.099	0.101
		50	0.044	0.048	0.101	0.100
			0.049	0.052	0.102	0.101

Table 4.36 Power of Sequential Tests - H_0: Gamma(3.5,1) vs. H_a: Gamma(3.5,1)

Null Distribution	Alternative Distribution	Sample Size	Sequential Power	Attained Level (0.050)	Sequential Power	Attained Level (0.100)
Gamma(3.5,1)	Gamma(3.5,1)	5	0.050	0.050	0.100	0.100
			0.044	0.048	0.101	0.100
					0.101	0.100
		15	0.052	0.050	0.101	0.099
			0.052	0.050	0.102	0.101
					0.103	0.100
		25	0.051	0.049	0.102	0.101
			0.051	0.050	0.103	0.101
					0.100	0.099
		50	0.052	0.052	0.100	0.101
			0.050	0.051	0.098	0.098

distribution demonstrated nearly equivalent power with claimed significance level. Figure 4.11 strongly supports these graphically.

4.6 Summary

The results for critical values, an attained significance level, and the power study obtained through the numerous Monte Carlo simulations were presented and discussed in this chapter. With a closer examination of scatter plots for critical values, some predictions for a power of sequential test were made. As one of characteristic of the sequential test, an attained significance level was derived. The contour plot for the attained significance level, which simplifies the selection of each individual significance level for a skewness test and a kurtosis test, also gave some insight

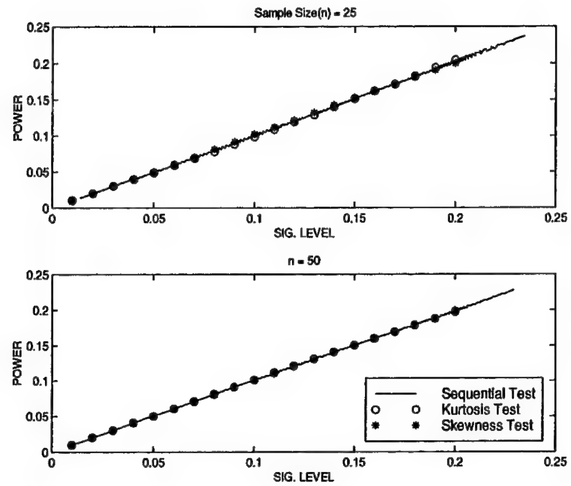


Figure 4.11 Power Plot - H_0 - Gamma(1,1); H_a: Gamma(1,1)

regarding the importance of choosing appropriate significance levels for individual tests to get better power. The power study was conducted on two sets of alternatives to identify how powerful the sequential test is. The comparative study with its competitor confirmed that the sequential test was powerful enough to be used in the goodness of fit field, showing much greater power than that of EDF tests in general. In addition to the sequential power study, individual two-tailed tests were made to understand the behavior of each component test as well as to quantify which tests were more powerful against specific alternatives, so that one might gain some insight into selecting the appropriate combination of significance levels. Sequentially, under the assumption of prior knowledge for a particular alternative, the power for the directional one-tailed test was performed. The enhanced power with the directional one-tailed test lead to a power study for the directional variants for the sequential test. Finally, to justify the computer programs developed in this thesis, the verification and validation for the Monte Carlo simulations used were discussed. The following chapter closes this thesis with conclusions and some recommendations.

V. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on the results and analysis obtained during this research effort.

5.1 Conclusions

The complexity of a modern system forces analysts to develop a simulation model to understand the operation of any exceedingly complex system. When data are available the model needs to employ an input model, such as theoretical probability distributions for the failure rate of such systems or the components of any system during their operational life. Since there is no single correct distribution in a real application, analysts and statisticians are frequently confronted with the problem of assessing agreement between a theoretical probability model and empirical observations. Goodness of fit tests provide helpful guidance for evaluating the suitability of a potential statistical input model. This thesis focuses on assessing the fit of such empirical observations to the gamma distribution.

Numerous goodness of fit tests for a gamma distribution based on different kinds of test statistics have been conducted. Usually, these goodness of fit tests have involved very complicated computational procedures. If there is the goodness of fit test that guarantees a computational efficiency as well as good performance against a wide range of alternative distributions, it will be the test most analysts prefer to use. In this thesis, the sequential goodness of fit test based on skewness and kurtosis for the three-parameter gamma distribution aims to be useful in terms of power and computational efficiency without requiring parameter estimation techniques.

The following observations and conclusions are made from the critical value, significance level, and two sets of power studies obtained in this thesis as follows:

1. The tabled skewness and the kurtosis critical values for the gamma distribution determined through Monte Carlo simulation are valid. The power studies achieved the claimed level of significance when the null hypotheses are true.

2. Some predictions based on an assessment of the critical value plots were made. First, the narrower range and rapid convergence of the skewness critical value would make the skewness test more powerful than the kurtosis test in most cases. Second, the kurtosis test would contribute to the sequential test power at larger values of the shape parameters more than at small values of the shape parameters. Third, the skewness test will dominate the kurtosis test due to a high degree of variability of upper tail kurtosis for sample sizes greater than or equal to 10. These were validated by the power study.

3. The contour plots for attained significance level allowed analysts to facilitate selecting the combination of each significance level for two test statistics. Based upon the examination of the behavior of an attained significance level, some expectations established are as follows. First, the power of the sequential test would be more variable at small sample sizes. Hence, more careful selection of α-level for each skewness and kurtosis test at small sample size was emphasized. Second, a trend of increasing curvature will provide better power by allowing the selection of the significance levels nearly equal to the overall significance level. Third, with the observation of more contour lines at small sample sizes and large value of the shape parameters, one can expect the sequential test power to be more powerful with a smaller sample and larger value of the shape parameters. Power comparison confirmed theses expectation above.

4. Two sets of power studies were performed: against common alternatives and against comparative studies. Overall, the power of the sequential test was outstanding.

    - For common alternative distributions, the power of the sequential test result is bounded by the individual two-tailed skewness and kurtosis test in most cases.

(a) When the null hypothesis distributions differ greatly from all of the alternatives in shape, the sequential test demonstrated excellent power.

(b) When the null hypothesis distributions do not differ greatly from all of the alternatives in shape, such as the gamma, chi-squared, and lognormal distributions, relatively lower power was observed.

- For the comparative power studies, when compared to the prominent Kolmogorov-Smirnov, Cramér-von Mises and Anderson-Darling EDF test statistics, the sequential test overall demonstrates outstanding power over all sample sizes.

  (a) With an hypothesized shape of $\beta = 1.5$, the sequential test against lognormal alternatives showed relatively lower power than EDF tests. However, the power of the sequential test is still acceptable. For gamma alternatives, the power shows superiority for smaller sample sizes, but for sample size more that 25, the power drops below that of the EDF tests.

  (b) For shape parameter, $\beta = 4$, the overall sequential test power revealed slightly decreased power as compared to $\beta = 1.5$. However, the performance of the sequential test was still notable. Again, the sequential test performed consistently higher over all sample sizes. For the normal and Weibull alternatives, the sequential test power surpassed that of the EDF test for sample size $n = 5$. But the power matched or slightly exceeded EDF's in the larger sample sizes. Against lognormal alternatives, this test failed to surpass the power of the EDF test, but, the power remained substantially high. The sequential test exhibits lower power than the EDF test for gamma alternatives. However, as shape increases, the gap was closed considerably.

5. Individual two-tailed tests were conducted focusing on identifying the most powerful test and understanding the behavior of the sequential test power. In general, the sequential test power was bounded by the individual test power. That is, the sequential test power is less

powerful than the best powerful test and attains power greater than the least powerful test. As predicted from the critical value plots, the skewness test dominated the kurtosis test in most cases. For gamma hypothesis with $\beta = 0.5$, the skewness test is very powerful. As the shape parameter increases toward $\beta = 4$, the kurtosis test shows significant power at small sample sizes. Because of the particularly effective complementary relationship between the two component tests, the power of the sequential test was not bounded as most cases, but it was positioned above of two component tests. However, as sample size increases, the skewness test recovered its superiority for the kurtosis test.

6. Finally, since the directional one-tailed test demonstrates improved power, the sequential test procedure was modified by incorporating a one-sided version of the $\sqrt{b_1}$ test or b_2 test against the lognormal alternative. The directional sequential variants test outperformed the power of the original two-tailed tests substantially.

5.2 Recommendations

5.2.1 Recommendation for Users. Some recommendations on the employment of the test based on the findings are suggested

In making this sequential goodness of fit test based on the skewness and the kurtosis for the three-parameter gamma distribution, the test procedures are very similar to a usual goodness of fit test. Since this test involves two test statistics, there are some factors that should be considered in selecting an attained significance level.

Typical goodness of fit test procedures are as follows:

1. Collect data on the real system being analyzed.
2. Identify or hypothesize a probability distribution or family of distributions to fit the data collected.

3. Compute the skewness and the kurtosis test statistics.

■ **Determination of Attained Significance Level** ■
✔ **Higher Significance Level Provides Better Power** ✔ **Identify More Powerful Test** ✔ **Pick Higher Level for More Powerful Test** ✔ **Pick Lower Level for Less Powerful Test** ✔ **Reference Power Comparison Plots** ✔ **Use Contour Plot to Select Each Significance Level**

Figure 5.1 Considerations for Selecting an Attained Significance Level

Once a null hypothesis and alternative distribution has been specified the next step is to determine an attained significance level (Figure 5.1). Recall that selecting a higher significance level guarantees better power since decreased Type II error improves power. Selecting the significance level for each components was somewhat problematic because the power of the sequential test varies with different combinations of significance levels. With the analysis of individual two-tail skewness and kurtosis test, the problem is cleared up. Under the same overall significance level, picking a combination of higher significance levels for the more powerful component and lower levels for the less powerful component test provides better power. To identify which tests are more powerful over all shape parameters against a specific alternative distribution, reference the power comparison plots in the Appendix F. Use contour plots to select the combination of significance levels for the two component tests to conduct the test efficiently.

Additionally, if an analyst can gather some additional information regarding a potential alternative distribution for the sample being used, a directional sequential test is recommended. It will guarantee better power. However, if no such information is available on possible alternatives

or time is restricted to obtain such information, nearly equal significance levels for both tests at least provide higher average power against the spectrum of alternatives.

5.2.2 Recommendations for further research. The following recommendations are proposed for further study:

1. As found in the power comparison plot (Appendix F), the individual $\sqrt{b_1}$ test is observed as the upper bound in many cases. On the contrary, the individual b_2 test reveals the lowest power, especially at gamma shape parameter 0.5. This might be caused by a high degree of variability of the b_2 as mentioned in the observation of the critical values. Hence, to improve the sequential test power, it is logical to make the sequential test using another test statistics in the place of the b_2 test statistic.

2. Each component test has its own strength; Skewness test more powerful for skewed distribution and larger sample sizes. Kurtosis test is better for similarly skewed and symmetric distributions. Thus, to massage the behavior of the sequential test and to evaluate the practical power of the sequential test, new strategy for picking alternatives is strongly suggested. Doing so will be somewhat challenging, but once those alternatives are selected successfully, it can be useful to understand the behavior of the sequential tests. Those 9 alternatives are as follows: First set is negatively skewed distribution with - short tail, moderate tail, and long tail distributions. Second set is positively skewed with - short tail, moderate tail, and long tail distribution. Third set is symmetric distribution with - short tail, moderate tail, and long tail.

3. Directional one-tailed power study demonstrated a significant improvement in power. Thus, the endeavor to make a sequential variants test by employing a one-sided version over above alternatives that will be chosen by the new strategy would be worthy.

4. As a way to simplify the application of the test procedure,the following two procedures would permit the goodness of fit test to be applied for other sample sizes and shape parameters without the use of tables.

   (a) Determination of asymptotic critical values for the skewness and the kurtosis can be recommended

   (b) An attempt to fit a functional relationship between critical value and shape parameter along with the significance levels using the method of least squares can be made.

Appendix A. Critical Values

A.1 Sample Skewness Percentage Points

Table A.1 Skewness ($\sqrt{b_1}$) Lower Tail Critical Values: $\beta = 0.5$

Sample	Significance Level (α)									
Size	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	-0.964	-0.745	-0.602	-0.507	-0.436	-0.398	-0.368	-0.339	-0.31	-0.283
10	-0.16	-0.025	0.047	0.103	0.15	0.189	0.224	0.255	0.282	0.309
15	0.175	0.284	0.351	0.404	0.444	0.479	0.512	0.539	0.565	0.589
20	0.364	0.466	0.532	0.582	0.619	0.654	0.683	0.71	0.736	0.758
25	0.522	0.615	0.675	0.721	0.758	0.791	0.82	0.845	0.869	0.891
30	0.623	0.717	0.775	0.821	0.855	0.886	0.915	0.94	0.962	0.984
35	0.72	0.807	0.862	0.907	0.943	0.975	1.004	1.03	1.052	1.072
40	0.797	0.878	0.933	0.973	1.009	1.039	1.066	1.091	1.114	1.133
45	0.854	0.938	0.995	1.037	1.07	1.101	1.127	1.151	1.172	1.193
50	0.915	0.994	1.047	1.086	1.122	1.15	1.175	1.197	1.218	1.238

Sample	Significance Level (α)									
Size	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	-0.256	-0.23	-0.205	-0.182	-0.157	-0.134	-0.111	-0.088	-0.066	-0.045
10	0.333	0.355	0.376	0.395	0.415	0.432	0.449	0.465	0.482	0.497
15	0.609	0.63	0.649	0.668	0.685	0.702	0.718	0.732	0.748	0.763
20	0.78	0.799	0.817	0.835	0.854	0.87	0.885	0.9	0.914	0.927
25	0.912	0.931	0.95	0.966	0.982	0.996	1.011	1.025	1.039	1.054
30	1.004	1.022	1.039	1.057	1.073	1.087	1.102	1.116	1.128	1.142
35	1.091	1.109	1.127	1.143	1.158	1.173	1.186	1.2	1.213	1.226
40	1.152	1.171	1.187	1.203	1.218	1.234	1.249	1.262	1.275	1.287
45	1.21	1.227	1.243	1.26	1.274	1.288	1.302	1.315	1.329	1.342
50	1.257	1.272	1.29	1.306	1.319	1.333	1.348	1.361	1.375	1.388

Sample	Significance Level (α)									
Size	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	-0.004	0.034	0.069	0.102	0.135	0.165	0.194	0.22	0.245	0.268
10	0.527	0.555	0.582	0.606	0.63	0.653	0.676	0.698	0.72	0.74
15	0.789	0.813	0.838	0.862	0.885	0.908	0.929	0.951	0.972	0.991
20	0.953	0.978	1.002	1.025	1.046	1.067	1.087	1.108	1.128	1.145
25	1.08	1.103	1.127	1.149	1.17	1.191	1.21	1.229	1.248	1.267
30	1.168	1.192	1.216	1.237	1.258	1.278	1.298	1.318	1.337	1.355
35	1.251	1.274	1.296	1.318	1.339	1.359	1.377	1.396	1.415	1.433
40	1.313	1.335	1.358	1.378	1.398	1.417	1.437	1.457	1.476	1.493
45	1.366	1.389	1.412	1.432	1.451	1.47	1.49	1.509	1.527	1.545
50	1.413	1.435	1.457	1.478	1.499	1.518	1.536	1.555	1.572	1.591

Table A.2 Skewness ($\sqrt{b_1}$) Upper Tail Critical Values: $\beta = 0.5$

Sample Size	Significance Level (1-α)									
	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	1.498	1.496	1.493	1.491	1.488	1.485	1.482	1.479	1.475	1.472
10	2.599	2.565	2.533	2.507	2.482	2.458	2.434	2.412	2.39	2.37
15	3.242	3.159	3.094	3.04	2.987	2.94	2.897	2.862	2.824	2.788
20	3.689	3.56	3.465	3.384	3.314	3.251	3.196	3.147	3.102	3.061
25	4.032	3.854	3.723	3.624	3.536	3.457	3.392	3.333	3.274	3.22
30	4.261	4.045	3.892	3.783	3.684	3.602	3.526	3.456	3.395	3.342
35	4.476	4.215	4.031	3.903	3.795	3.7	3.62	3.554	3.492	3.436
40	4.637	4.356	4.173	4.02	3.902	3.803	3.714	3.637	3.563	3.503
45	4.785	4.463	4.259	4.102	3.977	3.875	3.785	3.71	3.641	3.578
50	4.85	4.533	4.33	4.164	4.042	3.924	3.824	3.746	3.671	3.609

Sample Size	Significance Level (1-α)									
	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	1.468	1.465	1.461	1.457	1.452	1.448	1.444	1.44	1.435	1.431
10	2.348	2.328	2.309	2.29	2.272	2.255	2.235	2.217	2.198	2.182
15	2.752	2.721	2.688	2.659	2.629	2.602	2.576	2.55	2.525	2.503
20	3.014	2.976	2.935	2.899	2.865	2.832	2.799	2.769	2.741	2.711
25	3.171	3.126	3.084	3.043	3.008	2.973	2.94	2.907	2.877	2.847
30	3.291	3.236	3.191	3.151	3.111	3.073	3.039	3.007	2.975	2.944
35	3.383	3.333	3.283	3.244	3.202	3.165	3.128	3.095	3.059	3.028
40	3.447	3.392	3.338	3.295	3.253	3.213	3.179	3.142	3.107	3.074
45	3.517	3.463	3.41	3.365	3.322	3.278	3.24	3.203	3.169	3.134
50	3.549	3.489	3.437	3.391	3.349	3.31	3.271	3.234	3.198	3.165

Sample Size	Significance Level (1-α)									
	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	1.421	1.412	1.401	1.39	1.379	1.368	1.356	1.344	1.33	1.317
10	2.148	2.113	2.081	2.048	2.016	1.983	1.952	1.923	1.893	1.864
15	2.454	2.409	2.366	2.324	2.285	2.245	2.209	2.176	2.144	2.113
20	2.657	2.607	2.559	2.516	2.476	2.437	2.404	2.371	2.339	2.307
25	2.791	2.739	2.69	2.647	2.605	2.564	2.526	2.49	2.456	2.424
30	2.887	2.834	2.788	2.741	2.699	2.658	2.619	2.584	2.549	2.516
35	2.969	2.916	2.866	2.819	2.775	2.732	2.693	2.655	2.622	2.587
40	3.016	2.963	2.911	2.862	2.819	2.779	2.74	2.701	2.665	2.633
45	3.073	3.017	2.964	2.914	2.872	2.829	2.789	2.75	2.715	2.681
50	3.106	3.053	3.005	2.958	2.914	2.874	2.835	2.799	2.761	2.727

Table A.3 Skewness ($\sqrt{b_1}$) Lower Tail Critical Values: $\beta = 1.0$

Sample	Significance Level (α)									
Size	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	-1.161	-0.988	-0.874	-0.78	-0.704	-0.639	-0.588	-0.541	-0.499	-0.464
10	-0.459	-0.333	-0.25	-0.188	-0.14	-0.096	-0.061	-0.029	-0.003	0.022
15	-0.138	-0.034	0.034	0.082	0.123	0.156	0.188	0.218	0.244	0.266
20	0.051	0.156	0.216	0.268	0.306	0.337	0.365	0.389	0.411	0.431
25	0.191	0.286	0.337	0.38	0.42	0.451	0.479	0.503	0.524	0.543
30	0.301	0.384	0.436	0.477	0.511	0.54	0.564	0.588	0.61	0.628
35	0.398	0.473	0.52	0.561	0.594	0.623	0.648	0.67	0.689	0.707
40	0.452	0.528	0.578	0.616	0.647	0.673	0.698	0.718	0.738	0.756
45	0.511	0.591	0.638	0.674	0.705	0.731	0.755	0.776	0.794	0.811
50	0.568	0.637	0.684	0.719	0.75	0.777	0.796	0.816	0.833	0.85

Sample	Significance Level (α)									
Size	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	-0.435	-0.411	-0.392	-0.374	-0.355	-0.337	-0.318	-0.302	-0.284	-0.268
10	0.046	0.069	0.088	0.108	0.126	0.143	0.161	0.178	0.193	0.208
15	0.288	0.307	0.326	0.344	0.36	0.378	0.393	0.409	0.424	0.437
20	0.45	0.47	0.487	0.502	0.519	0.535	0.549	0.563	0.576	0.589
25	0.562	0.579	0.596	0.61	0.625	0.638	0.651	0.664	0.676	0.689
30	0.647	0.663	0.679	0.693	0.708	0.721	0.733	0.746	0.758	0.77
35	0.724	0.739	0.755	0.769	0.783	0.795	0.809	0.82	0.832	0.843
40	0.772	0.788	0.803	0.817	0.831	0.843	0.856	0.867	0.877	0.889
45	0.827	0.842	0.856	0.869	0.883	0.895	0.907	0.917	0.928	0.939
50	0.866	0.881	0.895	0.908	0.921	0.933	0.944	0.955	0.966	0.977

Sample	Significance Level (α)									
Size	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	-0.232	-0.2	-0.169	-0.139	-0.108	-0.08	-0.053	-0.025	0.003	0.027
10	0.238	0.265	0.291	0.315	0.338	0.36	0.381	0.402	0.422	0.441
15	0.463	0.488	0.512	0.536	0.557	0.577	0.596	0.615	0.633	0.651
20	0.612	0.635	0.657	0.678	0.699	0.718	0.736	0.756	0.773	0.79
25	0.713	0.735	0.755	0.776	0.796	0.814	0.832	0.85	0.867	0.884
30	0.792	0.813	0.835	0.854	0.873	0.891	0.91	0.927	0.943	0.959
35	0.866	0.886	0.906	0.924	0.942	0.96	0.976	0.992	1.008	1.023
40	0.91	0.93	0.95	0.969	0.986	1.003	1.019	1.035	1.05	1.066
45	0.959	0.977	0.996	1.014	1.031	1.048	1.064	1.081	1.095	1.11
50	0.997	1.016	1.035	1.053	1.07	1.087	1.103	1.119	1.134	1.148

Table A.4 Skewness ($\sqrt{b_1}$) Upper Tail Critical Values: $\beta = 1.0$

Sample Size	Significance Level (1-α)									
	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	1.486	1.477	1.468	1.459	1.45	1.441	1.432	1.424	1.415	1.406
10	2.464	2.389	2.335	2.291	2.249	2.214	2.176	2.143	2.112	2.08
15	2.971	2.834	2.731	2.652	2.586	2.529	2.475	2.427	2.383	2.34
20	3.286	3.097	2.966	2.868	2.785	2.713	2.654	2.6	2.548	2.502
25	3.458	3.241	3.096	2.993	2.904	2.826	2.759	2.698	2.645	2.588
30	3.646	3.379	3.213	3.088	2.985	2.901	2.826	2.762	2.708	2.658
35	3.714	3.425	3.26	3.135	3.03	2.943	2.869	2.801	2.744	2.689
40	3.794	3.51	3.336	3.194	3.082	2.999	2.924	2.857	2.795	2.741
45	3.846	3.526	3.334	3.203	3.095	3.008	2.929	2.865	2.805	2.758
50	3.868	3.558	3.357	3.217	3.114	3.021	2.939	2.869	2.81	2.759

Sample Size	Significance Level (1-α)									
	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	1.396	1.388	1.379	1.371	1.362	1.353	1.344	1.336	1.326	1.317
10	2.052	2.023	1.998	1.971	1.948	1.924	1.901	1.879	1.857	1.835
15	2.301	2.263	2.228	2.196	2.165	2.137	2.11	2.083	2.058	2.035
20	2.458	2.418	2.382	2.348	2.314	2.286	2.255	2.227	2.199	2.174
25	2.541	2.5	2.461	2.423	2.388	2.358	2.328	2.3	2.274	2.25
30	2.612	2.568	2.53	2.493	2.458	2.425	2.394	2.367	2.34	2.312
35	2.643	2.599	2.564	2.527	2.49	2.456	2.429	2.399	2.371	2.344
40	2.69	2.646	2.604	2.566	2.528	2.495	2.464	2.436	2.408	2.38
45	2.711	2.666	2.625	2.59	2.552	2.523	2.492	2.462	2.434	2.407
50	2.712	2.668	2.626	2.586	2.551	2.52	2.49	2.46	2.435	2.411

Sample Size	Significance Level (1-α)									
	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	1.299	1.28	1.262	1.241	1.222	1.202	1.183	1.162	1.142	1.123
10	1.795	1.754	1.717	1.68	1.646	1.613	1.584	1.553	1.524	1.495
15	1.991	1.949	1.909	1.872	1.837	1.804	1.772	1.739	1.712	1.686
20	2.125	2.08	2.041	2.001	1.965	1.93	1.9	1.869	1.841	1.813
25	2.201	2.155	2.113	2.075	2.039	2.004	1.971	1.94	1.91	1.882
30	2.263	2.218	2.177	2.137	2.1	2.065	2.032	2.001	1.971	1.942
35	2.296	2.25	2.207	2.168	2.134	2.099	2.067	2.035	2.006	1.98
40	2.333	2.288	2.244	2.205	2.168	2.133	2.101	2.072	2.043	2.014
45	2.358	2.313	2.27	2.231	2.196	2.163	2.131	2.101	2.073	2.045
50	2.365	2.322	2.283	2.246	2.21	2.176	2.146	2.117	2.088	2.061

Table A.5 Skewness ($\sqrt{b_1}$) Lower Tail Critical Values: $\beta = 1.5$

Sample	Significance Level (α)									
Size	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	-1.201	-1.07	-0.969	-0.884	-0.812	-0.753	-0.697	-0.649	-0.608	-0.573
10	-0.637	-0.489	-0.404	-0.343	-0.291	-0.246	-0.21	-0.179	-0.15	-0.123
15	-0.293	-0.181	-0.116	-0.07	-0.028	0.009	0.041	0.067	0.091	0.113
20	-0.104	-0.009	0.055	0.103	0.139	0.171	0.197	0.222	0.244	0.265
25	0.022	0.111	0.166	0.212	0.247	0.276	0.301	0.324	0.345	0.364
30	0.113	0.201	0.253	0.294	0.329	0.359	0.383	0.407	0.428	0.446
35	0.203	0.284	0.333	0.373	0.403	0.43	0.455	0.475	0.495	0.512
40	0.26	0.342	0.391	0.431	0.462	0.488	0.511	0.531	0.548	0.564
45	0.325	0.398	0.446	0.478	0.507	0.532	0.554	0.573	0.592	0.609
50	0.366	0.437	0.486	0.52	0.548	0.573	0.595	0.613	0.631	0.648

Sample	Significance Level (α)									
Size	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	-0.539	-0.51	-0.483	-0.459	-0.435	-0.414	-0.398	-0.382	-0.367	-0.351
10	-0.099	-0.079	-0.059	-0.039	-0.021	-0.003	0.014	0.03	0.046	0.061
15	0.133	0.153	0.172	0.187	0.203	0.219	0.235	0.249	0.263	0.276
20	0.284	0.303	0.319	0.334	0.35	0.365	0.379	0.392	0.404	0.416
25	0.381	0.399	0.414	0.43	0.445	0.459	0.472	0.485	0.498	0.509
30	0.464	0.48	0.497	0.511	0.524	0.538	0.55	0.562	0.574	0.585
35	0.529	0.545	0.559	0.573	0.586	0.598	0.609	0.62	0.632	0.643
40	0.58	0.594	0.609	0.623	0.634	0.646	0.658	0.669	0.68	0.691
45	0.625	0.64	0.653	0.666	0.678	0.69	0.701	0.712	0.722	0.731
50	0.663	0.677	0.69	0.702	0.713	0.725	0.737	0.748	0.758	0.768

Sample	Significance Level (α)									
Size	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	-0.32	-0.29	-0.263	-0.233	-0.205	-0.178	-0.153	-0.127	-0.101	-0.077
10	0.089	0.116	0.143	0.169	0.191	0.214	0.236	0.257	0.277	0.296
15	0.302	0.327	0.351	0.372	0.394	0.414	0.434	0.453	0.472	0.489
20	0.441	0.464	0.486	0.506	0.525	0.544	0.561	0.578	0.594	0.611
25	0.531	0.552	0.572	0.591	0.609	0.627	0.644	0.661	0.677	0.693
30	0.607	0.627	0.645	0.664	0.681	0.698	0.715	0.73	0.746	0.761
35	0.664	0.684	0.703	0.72	0.737	0.753	0.769	0.785	0.8	0.815
40	0.711	0.728	0.746	0.763	0.78	0.796	0.812	0.827	0.841	0.855
45	0.75	0.769	0.786	0.802	0.818	0.834	0.849	0.864	0.878	0.893
50	0.787	0.803	0.82	0.837	0.853	0.869	0.884	0.899	0.912	0.925

Table A.6 Skewness ($\sqrt{b_1}$) Upper Tail Critical Values: $\beta = 1.5$

Sample	Significance Level (1-α)									
Size	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	1.476	1.459	1.444	1.431	1.418	1.405	1.393	1.381	1.369	1.357
10	2.366	2.273	2.201	2.145	2.097	2.05	2.01	1.974	1.942	1.906
15	2.783	2.625	2.517	2.428	2.358	2.298	2.243	2.194	2.149	2.108
20	3.025	2.813	2.675	2.571	2.489	2.424	2.364	2.308	2.255	2.207
25	3.172	2.936	2.776	2.667	2.573	2.494	2.429	2.374	2.325	2.277
30	3.256	2.989	2.83	2.704	2.612	2.537	2.471	2.413	2.361	2.316
35	3.312	3.036	2.868	2.735	2.639	2.56	2.498	2.437	2.385	2.337
40	3.339	3.055	2.89	2.769	2.668	2.58	2.506	2.448	2.397	2.35
45	3.381	3.069	2.882	2.761	2.67	2.593	2.522	2.464	2.413	2.366
50	3.393	3.09	2.918	2.779	2.678	2.596	2.53	2.471	2.416	2.369

Sample	Significance Level (1-α)									
Size	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	1.345	1.334	1.322	1.311	1.298	1.288	1.276	1.265	1.254	1.242
10	1.875	1.846	1.817	1.79	1.764	1.739	1.716	1.693	1.671	1.648
15	2.067	2.029	1.994	1.961	1.93	1.903	1.878	1.85	1.826	1.802
20	2.164	2.124	2.091	2.06	2.028	2	1.973	1.948	1.925	1.902
25	2.231	2.192	2.153	2.117	2.086	2.058	2.031	2.004	1.978	1.952
30	2.274	2.237	2.199	2.161	2.131	2.102	2.072	2.046	2.02	1.997
35	2.294	2.249	2.213	2.18	2.152	2.122	2.096	2.069	2.045	2.021
40	2.307	2.271	2.236	2.203	2.17	2.142	2.115	2.089	2.063	2.04
45	2.323	2.282	2.245	2.211	2.179	2.15	2.122	2.095	2.071	2.049
50	2.327	2.289	2.252	2.221	2.189	2.159	2.134	2.107	2.083	2.06

Sample	Significance Level (1-α)									
Size	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	1.22	1.198	1.176	1.153	1.131	1.108	1.084	1.063	1.042	1.02
10	1.607	1.57	1.531	1.498	1.465	1.434	1.405	1.378	1.35	1.325
15	1.759	1.719	1.683	1.648	1.616	1.586	1.555	1.525	1.497	1.471
20	1.859	1.82	1.783	1.748	1.713	1.68	1.649	1.621	1.594	1.569
25	1.906	1.865	1.828	1.792	1.761	1.731	1.7	1.672	1.645	1.62
30	1.952	1.909	1.872	1.835	1.802	1.772	1.741	1.713	1.687	1.662
35	1.976	1.936	1.899	1.865	1.832	1.801	1.771	1.743	1.717	1.693
40	1.993	1.952	1.915	1.882	1.849	1.819	1.791	1.765	1.738	1.714
45	2.005	1.965	1.931	1.898	1.867	1.837	1.81	1.783	1.758	1.734
50	2.014	1.975	1.939	1.905	1.873	1.844	1.816	1.789	1.765	1.74

Table A.7 Skewness ($\sqrt{b_1}$) Lower Tail Critical Values: $\beta = 2.0$

Sample	Significance Level (α)									
Size	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	-1.246	-1.124	-1.032	-0.953	-0.889	-0.831	-0.782	-0.737	-0.693	-0.654
10	-0.729	-0.582	-0.496	-0.43	-0.379	-0.34	-0.306	-0.273	-0.243	-0.216
15	-0.405	-0.29	-0.225	-0.175	-0.129	-0.092	-0.061	-0.034	-0.01	0.012
20	-0.229	-0.125	-0.06	-0.012	0.026	0.056	0.083	0.107	0.13	0.152
25	-0.088	0.004	0.059	0.103	0.139	0.167	0.191	0.214	0.236	0.254
30	0.001	0.09	0.144	0.185	0.219	0.247	0.27	0.294	0.314	0.334
35	0.087	0.17	0.219	0.259	0.288	0.313	0.337	0.358	0.375	0.393
40	0.151	0.229	0.279	0.312	0.342	0.368	0.39	0.41	0.428	0.445
45	0.207	0.282	0.33	0.364	0.389	0.412	0.434	0.453	0.472	0.488
50	0.248	0.319	0.362	0.397	0.425	0.449	0.471	0.49	0.508	0.523

Sample	Significance Level (α)									
Size	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	-0.619	-0.587	-0.558	-0.531	-0.507	-0.483	-0.462	-0.442	-0.424	-0.407
10	-0.191	-0.167	-0.146	-0.126	-0.107	-0.089	-0.072	-0.056	-0.04	-0.025
15	0.034	0.054	0.072	0.089	0.106	0.123	0.137	0.152	0.165	0.178
20	0.171	0.188	0.205	0.221	0.236	0.25	0.263	0.276	0.289	0.301
25	0.273	0.289	0.305	0.321	0.335	0.348	0.361	0.373	0.385	0.396
30	0.349	0.365	0.381	0.394	0.408	0.42	0.432	0.444	0.456	0.467
35	0.409	0.424	0.439	0.452	0.464	0.477	0.489	0.5	0.511	0.52
40	0.46	0.474	0.489	0.501	0.513	0.524	0.535	0.546	0.556	0.566
45	0.503	0.516	0.529	0.541	0.552	0.563	0.573	0.584	0.594	0.604
50	0.538	0.552	0.564	0.577	0.589	0.6	0.61	0.62	0.629	0.639

Sample	Significance Level (α)									
Size	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	-0.379	-0.351	-0.323	-0.295	-0.269	-0.243	-0.218	-0.193	-0.171	-0.146
10	0.004	0.031	0.055	0.08	0.103	0.125	0.148	0.168	0.187	0.205
15	0.203	0.226	0.249	0.271	0.29	0.31	0.329	0.346	0.363	0.381
20	0.326	0.348	0.368	0.387	0.406	0.425	0.442	0.459	0.476	0.494
25	0.418	0.438	0.458	0.477	0.496	0.512	0.529	0.544	0.559	0.575
30	0.488	0.507	0.526	0.545	0.562	0.578	0.594	0.609	0.624	0.639
35	0.539	0.558	0.576	0.593	0.609	0.626	0.64	0.653	0.668	0.682
40	0.586	0.604	0.622	0.638	0.653	0.668	0.683	0.697	0.711	0.725
45	0.623	0.64	0.656	0.672	0.688	0.702	0.716	0.73	0.744	0.758
50	0.658	0.675	0.691	0.707	0.721	0.736	0.75	0.763	0.776	0.789

Table A.8 Skewness ($\sqrt{b_1}$) Upper Tail Critical Values: $\beta = 2.0$

Sample	Significance Level (1-α)									
Size	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	1.468	1.446	1.43	1.413	1.397	1.382	1.367	1.353	1.339	1.324
10	2.308	2.194	2.115	2.053	1.997	1.951	1.905	1.865	1.828	1.792
15	2.672	2.493	2.373	2.288	2.209	2.14	2.083	2.033	1.987	1.947
20	2.847	2.636	2.493	2.385	2.297	2.227	2.173	2.12	2.076	2.033
25	2.938	2.699	2.548	2.436	2.347	2.273	2.212	2.16	2.112	2.072
30	2.994	2.742	2.578	2.464	2.371	2.297	2.237	2.181	2.131	2.086
35	3.047	2.783	2.614	2.502	2.405	2.327	2.264	2.206	2.157	2.116
40	3.018	2.759	2.597	2.477	2.384	2.31	2.248	2.195	2.147	2.109
45	3.06	2.781	2.613	2.497	2.406	2.333	2.27	2.217	2.169	2.124
50	3.029	2.756	2.595	2.48	2.39	2.317	2.256	2.202	2.154	2.112

Sample	Significance Level (1-α)									
Size	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	1.311	1.297	1.284	1.271	1.257	1.244	1.232	1.219	1.206	1.194
10	1.76	1.73	1.7	1.673	1.646	1.619	1.597	1.572	1.55	1.526
15	1.909	1.872	1.84	1.809	1.783	1.754	1.729	1.704	1.68	1.657
20	1.991	1.952	1.919	1.887	1.857	1.829	1.802	1.776	1.751	1.727
25	2.029	1.992	1.959	1.928	1.896	1.867	1.841	1.816	1.792	1.769
30	2.049	2.011	1.98	1.948	1.917	1.891	1.867	1.842	1.818	1.798
35	2.078	2.041	2.009	1.977	1.945	1.916	1.89	1.865	1.842	1.819
40	2.073	2.037	2.004	1.974	1.945	1.918	1.891	1.866	1.843	1.822
45	2.086	2.048	2.015	1.982	1.952	1.925	1.9	1.88	1.857	1.836
50	2.076	2.043	2.011	1.981	1.95	1.926	1.902	1.878	1.857	1.836

Sample	Significance Level (1-α)									
Size	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	1.168	1.144	1.12	1.096	1.072	1.049	1.025	1.002	0.979	0.955
10	1.486	1.448	1.413	1.38	1.347	1.317	1.29	1.261	1.236	1.21
15	1.617	1.577	1.54	1.503	1.472	1.443	1.414	1.386	1.36	1.335
20	1.685	1.647	1.612	1.579	1.546	1.517	1.489	1.461	1.435	1.41
25	1.729	1.691	1.654	1.619	1.59	1.56	1.532	1.505	1.48	1.456
30	1.755	1.717	1.683	1.651	1.619	1.59	1.563	1.538	1.512	1.488
35	1.778	1.739	1.705	1.673	1.643	1.614	1.587	1.561	1.536	1.513
40	1.781	1.743	1.71	1.68	1.651	1.623	1.597	1.572	1.548	1.524
45	1.794	1.758	1.726	1.694	1.666	1.638	1.611	1.588	1.565	1.542
50	1.798	1.762	1.728	1.698	1.669	1.642	1.618	1.593	1.571	1.549

Table A.9 Skewness ($\sqrt{b_1}$) Lower Tail Critical Values: $\beta = 2.5$

Sample	Significance Level (α)									
Size	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	-1.258	-1.149	-1.06	-0.986	-0.921	-0.866	-0.815	-0.769	-0.727	-0.69
10	-0.797	-0.656	-0.567	-0.505	-0.455	-0.413	-0.378	-0.348	-0.318	-0.288
15	-0.495	-0.372	-0.309	-0.255	-0.214	-0.175	-0.143	-0.115	-0.091	-0.068
20	-0.298	-0.196	-0.136	-0.089	-0.05	-0.02	0.006	0.031	0.053	0.073
25	-0.163	-0.081	-0.022	0.02	0.055	0.084	0.109	0.131	0.152	0.17
30	-0.074	0.01	0.064	0.102	0.134	0.161	0.185	0.206	0.227	0.244
35	0.007	0.086	0.134	0.172	0.203	0.229	0.251	0.271	0.29	0.307
40	0.074	0.145	0.191	0.226	0.255	0.28	0.301	0.321	0.338	0.354
45	0.119	0.191	0.238	0.274	0.301	0.325	0.347	0.366	0.383	0.398
50	0.165	0.232	0.278	0.313	0.338	0.362	0.382	0.399	0.417	0.431

Sample	Significance Level (α)									
Size	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	-0.653	-0.621	-0.591	-0.565	-0.54	-0.516	-0.496	-0.475	-0.456	-0.438
10	-0.262	-0.24	-0.218	-0.196	-0.175	-0.157	-0.14	-0.123	-0.107	-0.091
15	-0.048	-0.029	-0.01	0.007	0.023	0.038	0.052	0.067	0.079	0.093
20	0.094	0.112	0.129	0.144	0.16	0.173	0.186	0.199	0.212	0.223
25	0.188	0.204	0.221	0.235	0.25	0.263	0.276	0.288	0.3	0.311
30	0.261	0.278	0.293	0.307	0.319	0.332	0.344	0.355	0.367	0.377
35	0.323	0.338	0.351	0.365	0.378	0.39	0.401	0.412	0.423	0.433
40	0.37	0.383	0.397	0.409	0.422	0.434	0.445	0.455	0.466	0.476
45	0.413	0.428	0.44	0.452	0.464	0.475	0.486	0.495	0.507	0.517
50	0.446	0.459	0.471	0.483	0.495	0.505	0.516	0.525	0.535	0.545

Sample	Significance Level (α)									
Size	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	-0.407	-0.382	-0.355	-0.328	-0.304	-0.278	-0.255	-0.231	-0.208	-0.185
10	-0.061	-0.034	-0.009	0.015	0.039	0.061	0.082	0.102	0.122	0.141
15	0.117	0.142	0.165	0.186	0.206	0.225	0.244	0.262	0.281	0.298
20	0.248	0.269	0.289	0.309	0.33	0.348	0.365	0.382	0.398	0.415
25	0.333	0.355	0.376	0.393	0.411	0.429	0.445	0.46	0.476	0.491
30	0.397	0.416	0.433	0.451	0.469	0.485	0.501	0.516	0.531	0.546
35	0.452	0.47	0.487	0.504	0.52	0.535	0.55	0.565	0.579	0.593
40	0.495	0.512	0.529	0.545	0.56	0.575	0.589	0.603	0.616	0.63
45	0.534	0.551	0.567	0.583	0.598	0.613	0.625	0.638	0.652	0.664
50	0.563	0.58	0.596	0.611	0.626	0.64	0.653	0.667	0.68	0.692

Table A.10 Skewness ($\sqrt{b_1}$) Upper Tail Critical Values: $\beta = 2.5$

Sample Size	Significance Level (1-α)									
	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	1.462	1.438	1.418	1.398	1.381	1.365	1.349	1.333	1.317	1.302
10	2.242	2.127	2.039	1.97	1.915	1.865	1.82	1.776	1.74	1.707
15	2.576	2.391	2.274	2.18	2.106	2.038	1.983	1.928	1.885	1.844
20	2.674	2.479	2.35	2.252	2.175	2.102	2.043	1.99	1.945	1.903
25	2.786	2.541	2.39	2.285	2.2	2.133	2.07	2.015	1.966	1.923
30	2.817	2.564	2.41	2.3	2.219	2.147	2.091	2.036	1.987	1.944
35	2.82	2.579	2.426	2.319	2.231	2.16	2.1	2.047	2	1.954
40	2.841	2.589	2.429	2.314	2.227	2.157	2.099	2.048	1.998	1.956
45	2.8	2.559	2.406	2.294	2.205	2.134	2.077	2.026	1.983	1.944
50	2.784	2.533	2.378	2.269	2.192	2.124	2.065	2.015	1.97	1.928

Sample Size	Significance Level (1-α)									
	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	1.286	1.271	1.256	1.242	1.228	1.213	1.201	1.187	1.174	1.16
10	1.673	1.642	1.616	1.586	1.557	1.53	1.507	1.483	1.462	1.439
15	1.803	1.765	1.734	1.704	1.676	1.65	1.624	1.6	1.578	1.556
20	1.867	1.834	1.802	1.769	1.739	1.711	1.685	1.661	1.639	1.619
25	1.884	1.848	1.815	1.783	1.756	1.732	1.708	1.685	1.66	1.639
30	1.905	1.87	1.835	1.804	1.776	1.75	1.724	1.7	1.679	1.658
35	1.916	1.88	1.845	1.815	1.786	1.761	1.736	1.712	1.689	1.671
40	1.916	1.88	1.848	1.822	1.793	1.767	1.741	1.719	1.698	1.679
45	1.908	1.875	1.845	1.816	1.79	1.765	1.742	1.72	1.699	1.679
50	1.896	1.866	1.838	1.809	1.782	1.758	1.737	1.715	1.695	1.677

Sample Size	Significance Level (1-α)									
	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	1.134	1.108	1.082	1.056	1.032	1.008	0.982	0.957	0.933	0.91
10	1.4	1.362	1.328	1.297	1.266	1.237	1.209	1.184	1.157	1.134
15	1.513	1.474	1.439	1.406	1.375	1.345	1.316	1.289	1.263	1.239
20	1.578	1.54	1.506	1.471	1.439	1.411	1.383	1.357	1.332	1.308
25	1.598	1.561	1.529	1.497	1.467	1.439	1.413	1.387	1.362	1.338
30	1.617	1.581	1.549	1.517	1.487	1.46	1.434	1.409	1.385	1.362
35	1.634	1.599	1.565	1.535	1.506	1.479	1.453	1.429	1.405	1.381
40	1.641	1.606	1.574	1.544	1.516	1.489	1.464	1.44	1.417	1.396
45	1.64	1.606	1.575	1.546	1.518	1.493	1.47	1.448	1.426	1.406
50	1.64	1.607	1.577	1.55	1.524	1.499	1.475	1.453	1.432	1.41

Table A.11 Skewness ($\sqrt{b_1}$) Lower Tail Critical Values: $\beta = 3.0$

Sample	Significance Level (α)									
Size	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	-1.278	-1.165	-1.077	-1.008	-0.948	-0.897	-0.847	-0.805	-0.764	-0.729
10	-0.863	-0.715	-0.622	-0.555	-0.502	-0.459	-0.421	-0.389	-0.361	-0.335
15	-0.56	-0.441	-0.367	-0.312	-0.269	-0.234	-0.204	-0.174	-0.148	-0.124
20	-0.366	-0.261	-0.199	-0.152	-0.113	-0.079	-0.05	-0.026	-0.004	0.016
25	-0.239	-0.146	-0.085	-0.042	-0.008	0.021	0.047	0.07	0.091	0.109
30	-0.138	-0.054	-0.001	0.04	0.073	0.101	0.126	0.147	0.166	0.184
35	-0.06	0.02	0.071	0.111	0.142	0.168	0.19	0.207	0.226	0.243
40	-0.003	0.079	0.127	0.161	0.189	0.213	0.235	0.252	0.27	0.286
45	0.06	0.132	0.176	0.207	0.236	0.258	0.278	0.297	0.315	0.33
50	0.1	0.169	0.211	0.245	0.272	0.292	0.313	0.331	0.348	0.363

Sample	Significance Level (α)									
Size	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	-0.695	-0.659	-0.632	-0.606	-0.579	-0.555	-0.532	-0.511	-0.491	-0.471
10	-0.312	-0.29	-0.267	-0.246	-0.227	-0.208	-0.19	-0.173	-0.157	-0.142
15	-0.102	-0.083	-0.065	-0.048	-0.033	-0.016	-0.002	0.012	0.026	0.04
20	0.034	0.052	0.07	0.084	0.098	0.114	0.128	0.14	0.153	0.165
25	0.127	0.144	0.158	0.172	0.185	0.198	0.21	0.223	0.234	0.246
30	0.2	0.216	0.232	0.246	0.258	0.271	0.283	0.295	0.305	0.316
35	0.258	0.273	0.286	0.299	0.312	0.323	0.334	0.345	0.355	0.365
40	0.301	0.316	0.33	0.343	0.354	0.365	0.376	0.386	0.395	0.405
45	0.346	0.359	0.372	0.383	0.395	0.405	0.415	0.424	0.433	0.443
50	0.376	0.39	0.402	0.413	0.424	0.434	0.445	0.455	0.464	0.473

Sample	Significance Level (α)									
Size	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	-0.437	-0.407	-0.383	-0.359	-0.335	-0.31	-0.287	-0.264	-0.242	-0.218
10	-0.113	-0.086	-0.06	-0.036	-0.012	0.01	0.031	0.052	0.071	0.089
15	0.065	0.088	0.109	0.13	0.151	0.171	0.188	0.206	0.224	0.242
20	0.188	0.209	0.229	0.249	0.268	0.286	0.303	0.32	0.336	0.352
25	0.267	0.287	0.307	0.326	0.343	0.36	0.377	0.393	0.408	0.422
30	0.337	0.355	0.372	0.389	0.406	0.421	0.436	0.451	0.466	0.48
35	0.385	0.403	0.419	0.436	0.452	0.467	0.481	0.495	0.509	0.523
40	0.423	0.441	0.457	0.473	0.488	0.502	0.516	0.53	0.543	0.557
45	0.46	0.476	0.493	0.508	0.523	0.537	0.551	0.564	0.577	0.59
50	0.49	0.507	0.523	0.537	0.551	0.564	0.578	0.591	0.603	0.616

Table A.12 Skewness ($\sqrt{b_1}$) Upper Tail Critical Values: $\beta = 3.0$

Sample	Significance Level (1-α)									
Size	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	1.458	1.432	1.408	1.388	1.369	1.352	1.334	1.317	1.3	1.284
10	2.201	2.082	1.986	1.916	1.86	1.808	1.762	1.717	1.677	1.639
15	2.466	2.282	2.158	2.067	1.994	1.933	1.88	1.831	1.789	1.748
20	2.554	2.358	2.232	2.135	2.059	1.998	1.941	1.89	1.844	1.804
25	2.664	2.428	2.285	2.175	2.091	2.018	1.96	1.905	1.86	1.822
30	2.678	2.442	2.296	2.18	2.096	2.026	1.967	1.916	1.87	1.826
35	2.676	2.426	2.269	2.168	2.085	2.019	1.964	1.913	1.867	1.825
40	2.67	2.408	2.265	2.152	2.075	2.01	1.954	1.91	1.87	1.832
45	2.658	2.407	2.269	2.159	2.078	2.01	1.954	1.907	1.861	1.821
50	2.63	2.392	2.237	2.137	2.054	1.989	1.933	1.884	1.843	1.805

Sample	Significance Level (1-α)									
Size	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	1.267	1.251	1.236	1.222	1.205	1.191	1.175	1.161	1.147	1.133
10	1.608	1.573	1.542	1.515	1.488	1.463	1.441	1.419	1.397	1.377
15	1.714	1.679	1.646	1.62	1.593	1.567	1.543	1.52	1.497	1.476
20	1.769	1.735	1.702	1.674	1.645	1.617	1.592	1.568	1.545	1.522
25	1.783	1.749	1.717	1.686	1.659	1.631	1.607	1.585	1.563	1.543
30	1.791	1.758	1.727	1.698	1.672	1.647	1.625	1.6	1.579	1.558
35	1.79	1.756	1.724	1.696	1.668	1.646	1.622	1.601	1.581	1.56
40	1.798	1.764	1.731	1.703	1.678	1.653	1.63	1.608	1.587	1.568
45	1.785	1.75	1.718	1.693	1.669	1.646	1.624	1.605	1.586	1.567
50	1.771	1.742	1.714	1.688	1.664	1.642	1.622	1.603	1.583	1.565

Sample	Significance Level (1-α)									
Size	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	1.105	1.076	1.048	1.022	0.995	0.969	0.944	0.919	0.894	0.869
10	1.34	1.302	1.267	1.235	1.205	1.178	1.15	1.124	1.1	1.075
15	1.435	1.399	1.365	1.331	1.301	1.272	1.243	1.218	1.192	1.169
20	1.482	1.445	1.41	1.38	1.348	1.323	1.297	1.27	1.246	1.223
25	1.503	1.468	1.434	1.403	1.375	1.347	1.322	1.297	1.274	1.251
30	1.522	1.487	1.454	1.423	1.395	1.369	1.343	1.319	1.294	1.274
35	1.523	1.489	1.459	1.431	1.405	1.379	1.354	1.331	1.308	1.286
40	1.532	1.499	1.469	1.44	1.414	1.389	1.366	1.344	1.322	1.301
45	1.533	1.502	1.471	1.443	1.416	1.391	1.367	1.345	1.324	1.304
50	1.531	1.501	1.472	1.447	1.422	1.399	1.377	1.355	1.334	1.315

Table A.13 Skewness ($\sqrt{b_1}$) Lower Tail Critical Values: $\beta = 3.5$

Sample	Significance Level (α)									
Size	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	-1.295	-1.187	-1.105	-1.036	-0.974	-0.922	-0.876	-0.829	-0.792	-0.758
10	-0.887	-0.745	-0.663	-0.599	-0.546	-0.5	-0.462	-0.429	-0.4	-0.375
15	-0.6	-0.485	-0.41	-0.357	-0.314	-0.277	-0.244	-0.217	-0.192	-0.167
20	-0.414	-0.311	-0.247	-0.199	-0.161	-0.131	-0.1	-0.075	-0.051	-0.029
25	-0.289	-0.192	-0.13	-0.087	-0.052	-0.023	0.003	0.024	0.045	0.064
30	-0.187	-0.102	-0.051	-0.01	0.02	0.047	0.071	0.092	0.111	0.128
35	-0.109	-0.029	0.016	0.053	0.083	0.108	0.132	0.152	0.171	0.188
40	-0.055	0.024	0.069	0.103	0.133	0.158	0.181	0.2	0.218	0.235
45	0.003	0.075	0.119	0.153	0.181	0.206	0.226	0.246	0.263	0.277
50	0.042	0.112	0.154	0.188	0.215	0.239	0.259	0.276	0.292	0.306

Sample	Significance Level (α)									
Size	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	-0.723	-0.691	-0.66	-0.632	-0.607	-0.584	-0.561	-0.539	-0.517	-0.496
10	-0.348	-0.326	-0.304	-0.284	-0.265	-0.247	-0.23	-0.214	-0.198	-0.182
15	-0.146	-0.126	-0.109	-0.091	-0.073	-0.057	-0.042	-0.028	-0.014	0
20	-0.01	0.009	0.026	0.041	0.054	0.069	0.083	0.095	0.108	0.12
25	0.081	0.098	0.112	0.126	0.14	0.154	0.166	0.178	0.19	0.201
30	0.144	0.16	0.174	0.189	0.201	0.214	0.226	0.238	0.249	0.26
35	0.204	0.22	0.234	0.246	0.259	0.27	0.282	0.292	0.303	0.313
40	0.25	0.264	0.277	0.29	0.302	0.313	0.324	0.336	0.346	0.355
45	0.291	0.305	0.319	0.33	0.342	0.352	0.363	0.374	0.383	0.393
50	0.32	0.332	0.345	0.357	0.368	0.378	0.388	0.397	0.407	0.416

Sample	Significance Level (α)									
Size	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	-0.462	-0.43	-0.401	-0.379	-0.355	-0.331	-0.308	-0.285	-0.264	-0.242
10	-0.152	-0.125	-0.1	-0.076	-0.052	-0.03	-0.008	0.013	0.033	0.052
15	0.026	0.049	0.071	0.091	0.111	0.131	0.149	0.168	0.186	0.203
20	0.143	0.164	0.184	0.203	0.221	0.239	0.256	0.272	0.288	0.304
25	0.223	0.243	0.262	0.28	0.298	0.314	0.33	0.345	0.36	0.374
30	0.282	0.3	0.318	0.335	0.352	0.367	0.382	0.396	0.41	0.424
35	0.332	0.35	0.366	0.382	0.397	0.413	0.427	0.441	0.454	0.467
40	0.373	0.389	0.406	0.421	0.436	0.45	0.464	0.478	0.491	0.503
45	0.409	0.425	0.441	0.456	0.47	0.484	0.497	0.51	0.523	0.535
50	0.433	0.449	0.464	0.479	0.493	0.507	0.52	0.533	0.545	0.557

Table A.14 Skewness ($\sqrt{b_1}$) Upper Tail Critical Values: $\beta = 3.5$

Sample	Significance Level (1-α)									
Size	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	1.456	1.426	1.4	1.379	1.36	1.341	1.323	1.303	1.286	1.268
10	2.161	2.031	1.94	1.87	1.813	1.756	1.706	1.663	1.625	1.59
15	2.391	2.219	2.1	2.006	1.932	1.868	1.815	1.767	1.723	1.685
20	2.51	2.297	2.159	2.061	1.981	1.911	1.854	1.805	1.763	1.727
25	2.531	2.304	2.162	2.06	1.977	1.911	1.855	1.807	1.764	1.726
30	2.541	2.315	2.179	2.074	1.994	1.925	1.868	1.819	1.777	1.737
35	2.578	2.317	2.161	2.056	1.982	1.918	1.869	1.823	1.784	1.743
40	2.529	2.286	2.154	2.055	1.977	1.909	1.856	1.804	1.764	1.727
45	2.523	2.289	2.155	2.056	1.978	1.91	1.853	1.804	1.763	1.725
50	2.484	2.246	2.11	2.02	1.944	1.881	1.825	1.783	1.744	1.709

Sample	Significance Level (1-α)									
Size	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	1.251	1.235	1.218	1.201	1.185	1.17	1.155	1.141	1.127	1.113
10	1.554	1.524	1.495	1.467	1.442	1.416	1.394	1.372	1.35	1.33
15	1.651	1.617	1.585	1.556	1.529	1.503	1.479	1.456	1.435	1.415
20	1.689	1.656	1.625	1.596	1.568	1.541	1.517	1.492	1.47	1.451
25	1.692	1.661	1.632	1.603	1.575	1.551	1.53	1.507	1.486	1.467
30	1.702	1.671	1.641	1.614	1.588	1.565	1.542	1.519	1.498	1.477
35	1.707	1.675	1.643	1.616	1.59	1.565	1.543	1.52	1.5	1.481
40	1.693	1.662	1.633	1.608	1.585	1.561	1.54	1.519	1.501	1.482
45	1.693	1.661	1.633	1.608	1.584	1.563	1.542	1.522	1.502	1.483
50	1.676	1.648	1.622	1.597	1.572	1.551	1.531	1.511	1.492	1.475

Sample	Significance Level (1-α)									
Size	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	1.085	1.057	1.03	1.003	0.974	0.946	0.919	0.895	0.87	0.847
10	1.29	1.252	1.216	1.185	1.154	1.126	1.1	1.074	1.049	1.025
15	1.376	1.338	1.304	1.27	1.239	1.21	1.184	1.161	1.135	1.112
20	1.411	1.375	1.342	1.31	1.28	1.255	1.229	1.204	1.181	1.16
25	1.428	1.394	1.361	1.332	1.305	1.279	1.252	1.229	1.206	1.183
30	1.44	1.408	1.377	1.348	1.32	1.293	1.269	1.246	1.223	1.202
35	1.446	1.413	1.382	1.353	1.326	1.301	1.278	1.256	1.234	1.214
40	1.446	1.417	1.388	1.36	1.335	1.311	1.29	1.267	1.248	1.228
45	1.451	1.42	1.391	1.364	1.339	1.316	1.293	1.272	1.252	1.232
50	1.443	1.413	1.386	1.36	1.336	1.314	1.293	1.271	1.252	1.233

Table A.15 Skewness ($\sqrt{b_1}$) Lower Tail Critical Values: $\beta = 4.0$

Sample Size	Significance Level (α)									
	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	-1.313	-1.206	-1.125	-1.056	-0.994	-0.94	-0.896	-0.852	-0.813	-0.777
10	-0.957	-0.806	-0.71	-0.638	-0.586	-0.539	-0.5	-0.466	-0.438	-0.409
15	-0.637	-0.521	-0.449	-0.391	-0.347	-0.314	-0.281	-0.254	-0.23	-0.205
20	-0.453	-0.351	-0.288	-0.239	-0.203	-0.17	-0.142	-0.116	-0.092	-0.071
25	-0.335	-0.24	-0.181	-0.14	-0.103	-0.072	-0.045	-0.021	-0.001	0.019
30	-0.235	-0.151	-0.097	-0.055	-0.022	0.005	0.03	0.05	0.071	0.089
35	-0.161	-0.078	-0.03	0.004	0.034	0.059	0.082	0.102	0.122	0.139
40	-0.095	-0.021	0.028	0.067	0.096	0.119	0.14	0.159	0.177	0.193
45	-0.048	0.021	0.072	0.105	0.135	0.158	0.179	0.199	0.216	0.231
50	0.006	0.07	0.114	0.147	0.175	0.198	0.218	0.234	0.25	0.265

Sample Size	Significance Level (α)									
	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	-0.745	-0.712	-0.683	-0.655	-0.628	-0.604	-0.579	-0.558	-0.537	-0.516
10	-0.386	-0.362	-0.342	-0.322	-0.303	-0.284	-0.268	-0.25	-0.234	-0.219
15	-0.185	-0.165	-0.145	-0.127	-0.11	-0.093	-0.079	-0.065	-0.051	-0.036
20	-0.052	-0.035	-0.019	-0.003	0.011	0.025	0.038	0.051	0.064	0.076
25	0.037	0.055	0.069	0.085	0.098	0.112	0.124	0.135	0.147	0.158
30	0.106	0.122	0.137	0.151	0.162	0.175	0.187	0.198	0.209	0.219
35	0.157	0.172	0.184	0.198	0.21	0.221	0.232	0.243	0.254	0.265
40	0.207	0.222	0.235	0.246	0.258	0.268	0.278	0.289	0.299	0.309
45	0.244	0.258	0.271	0.283	0.295	0.305	0.316	0.325	0.335	0.344
50	0.277	0.29	0.303	0.314	0.325	0.335	0.345	0.354	0.363	0.371

Sample Size	Significance Level (α)									
	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	-0.481	-0.448	-0.418	-0.395	-0.373	-0.35	-0.327	-0.304	-0.282	-0.261
10	-0.188	-0.159	-0.133	-0.108	-0.084	-0.062	-0.041	-0.021	-0.001	0.018
15	-0.012	0.011	0.034	0.056	0.076	0.096	0.114	0.132	0.15	0.167
20	0.1	0.121	0.141	0.16	0.179	0.197	0.214	0.23	0.247	0.263
25	0.179	0.199	0.218	0.237	0.254	0.27	0.286	0.302	0.317	0.332
30	0.239	0.257	0.276	0.292	0.308	0.325	0.339	0.355	0.37	0.384
35	0.284	0.302	0.319	0.334	0.349	0.364	0.378	0.393	0.407	0.421
40	0.327	0.344	0.36	0.375	0.39	0.405	0.419	0.432	0.445	0.458
45	0.361	0.377	0.393	0.408	0.422	0.435	0.449	0.462	0.474	0.486
50	0.388	0.406	0.422	0.436	0.449	0.461	0.474	0.487	0.499	0.511

Table A.16 Skewness ($\sqrt{b_1}$) Upper Tail Critical Values: $\beta = 4.0$

Sample Size	Significance Level (1-α)									
	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	1.454	1.422	1.396	1.372	1.351	1.332	1.312	1.293	1.274	1.255
10	2.131	1.996	1.899	1.834	1.776	1.723	1.673	1.632	1.593	1.555
15	2.359	2.158	2.038	1.954	1.881	1.819	1.761	1.714	1.668	1.63
20	2.457	2.233	2.092	1.988	1.907	1.843	1.788	1.743	1.701	1.663
25	2.488	2.251	2.101	2.002	1.922	1.855	1.801	1.753	1.708	1.671
30	2.45	2.234	2.088	1.985	1.904	1.842	1.789	1.744	1.702	1.665
35	2.442	2.217	2.078	1.976	1.9	1.838	1.784	1.735	1.693	1.655
40	2.459	2.204	2.063	1.965	1.89	1.833	1.78	1.733	1.692	1.658
45	2.41	2.166	2.038	1.945	1.872	1.811	1.759	1.713	1.675	1.638
50	2.382	2.154	2.032	1.935	1.86	1.799	1.746	1.705	1.665	1.634

Sample Size	Significance Level (1-α)									
	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	1.239	1.222	1.204	1.186	1.17	1.155	1.14	1.126	1.111	1.096
10	1.523	1.491	1.461	1.436	1.41	1.385	1.361	1.339	1.318	1.296
15	1.597	1.564	1.534	1.504	1.475	1.452	1.428	1.404	1.383	1.362
20	1.626	1.593	1.563	1.534	1.506	1.483	1.457	1.435	1.415	1.394
25	1.635	1.601	1.571	1.543	1.516	1.493	1.468	1.447	1.426	1.407
30	1.63	1.599	1.57	1.543	1.518	1.494	1.472	1.451	1.431	1.411
35	1.622	1.592	1.563	1.536	1.513	1.49	1.468	1.448	1.429	1.412
40	1.625	1.594	1.566	1.54	1.515	1.494	1.474	1.453	1.433	1.416
45	1.605	1.575	1.548	1.522	1.5	1.479	1.46	1.441	1.423	1.406
50	1.601	1.572	1.547	1.523	1.502	1.481	1.463	1.445	1.428	1.41

Sample Size	Significance Level (1-α)									
	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	1.067	1.037	1.008	0.979	0.951	0.923	0.899	0.874	0.849	0.825
10	1.258	1.221	1.187	1.154	1.123	1.097	1.069	1.043	1.019	0.994
15	1.324	1.289	1.255	1.225	1.196	1.168	1.14	1.113	1.089	1.067
20	1.356	1.322	1.29	1.259	1.231	1.204	1.178	1.153	1.13	1.107
25	1.371	1.338	1.306	1.278	1.249	1.222	1.197	1.174	1.151	1.131
30	1.376	1.345	1.313	1.283	1.257	1.232	1.208	1.187	1.166	1.146
35	1.376	1.343	1.314	1.287	1.261	1.239	1.215	1.194	1.174	1.154
40	1.384	1.353	1.325	1.297	1.271	1.25	1.227	1.205	1.185	1.165
45	1.374	1.343	1.316	1.29	1.267	1.245	1.222	1.203	1.183	1.165
50	1.377	1.348	1.323	1.297	1.275	1.253	1.232	1.212	1.192	1.174

Table A.17 Kurtosis (b_2) Lower Tail Critical Values: $\beta = 0.5$

Sample	Significance Level (α)									
Size	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	1.178	1.187	1.195	1.204	1.212	1.22	1.227	1.234	1.24	1.247
10	1.295	1.36	1.406	1.445	1.48	1.515	1.545	1.572	1.598	1.622
15	1.504	1.591	1.659	1.717	1.766	1.81	1.85	1.887	1.923	1.959
20	1.695	1.817	1.905	1.978	2.039	2.094	2.14	2.188	2.234	2.276
25	1.884	2.027	2.131	2.218	2.291	2.357	2.418	2.472	2.524	2.576
30	2.061	2.218	2.331	2.427	2.502	2.572	2.638	2.695	2.752	2.803
35	2.23	2.411	2.533	2.635	2.718	2.799	2.876	2.94	2.994	3.054
40	2.369	2.557	2.702	2.803	2.892	2.978	3.051	3.125	3.185	3.247
45	2.52	2.717	2.865	2.979	3.072	3.163	3.237	3.302	3.369	3.429
50	2.664	2.867	3.008	3.12	3.213	3.31	3.392	3.467	3.533	3.597

Sample	Significance Level (α)									
Size	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	1.252	1.258	1.264	1.27	1.276	1.282	1.289	1.296	1.303	1.311
10	1.646	1.667	1.688	1.708	1.726	1.744	1.761	1.778	1.796	1.814
15	1.994	2.027	2.058	2.089	2.118	2.148	2.173	2.2	2.228	2.254
20	2.318	2.359	2.397	2.431	2.468	2.504	2.535	2.569	2.599	2.631
25	2.622	2.665	2.707	2.748	2.789	2.827	2.862	2.898	2.931	2.967
30	2.856	2.905	2.954	3.001	3.048	3.086	3.127	3.169	3.205	3.242
35	3.111	3.163	3.216	3.264	3.305	3.349	3.392	3.433	3.473	3.516
40	3.304	3.361	3.412	3.465	3.513	3.558	3.606	3.65	3.691	3.735
45	3.485	3.54	3.591	3.645	3.697	3.746	3.795	3.845	3.889	3.932
50	3.658	3.716	3.77	3.821	3.875	3.925	3.974	4.022	4.069	4.114

Sample	Significance Level (α)									
Size	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	1.327	1.343	1.36	1.377	1.395	1.413	1.433	1.451	1.471	1.493
10	1.849	1.885	1.921	1.958	1.993	2.032	2.068	2.103	2.14	2.175
15	2.304	2.357	2.409	2.458	2.507	2.553	2.603	2.651	2.697	2.744
20	2.693	2.753	2.81	2.868	2.923	2.983	3.036	3.09	3.144	3.2
25	3.037	3.102	3.171	3.233	3.296	3.357	3.42	3.48	3.539	3.597
30	3.315	3.388	3.458	3.529	3.595	3.657	3.722	3.787	3.854	3.919
35	3.592	3.67	3.739	3.809	3.876	3.944	4.012	4.079	4.146	4.211
40	3.819	3.896	3.976	4.048	4.118	4.189	4.257	4.329	4.4	4.472
45	4.017	4.102	4.186	4.265	4.342	4.418	4.489	4.562	4.639	4.708
50	4.203	4.281	4.366	4.457	4.536	4.611	4.69	4.764	4.843	4.914

Table A.18 Kurtosis (b_2) Upper Tail Critical Values: $\beta = 0.5$

Sample	Significance Level (1-α)									
Size	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	3.247	3.244	3.241	3.238	3.233	3.229	3.225	3.221	3.216	3.212
10	7.896	7.785	7.68	7.595	7.514	7.435	7.355	7.282	7.21	7.14
15	12.046	11.669	11.375	11.128	10.885	10.683	10.476	10.309	10.139	9.97
20	15.684	14.966	14.44	13.993	13.593	13.253	12.955	12.681	12.427	12.201
25	18.912	17.782	16.981	16.336	15.783	15.283	14.891	14.505	14.153	13.821
30	21.523	20.012	18.976	18.184	17.515	16.943	16.411	15.927	15.51	15.129
35	24.054	22.077	20.694	19.73	18.918	18.214	17.639	17.085	16.63	16.191
40	26.214	23.969	22.422	21.193	20.303	19.484	18.777	18.145	17.575	17.108
45	28.288	25.508	23.758	22.465	21.395	20.552	19.778	19.087	18.494	17.952
50	29.59	26.823	24.96	23.453	22.361	21.372	20.468	19.74	19.101	18.47

Sample	Significance Level (1-α)									
Size	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	3.207	3.202	3.197	3.191	3.186	3.18	3.174	3.168	3.161	3.155
10	7.072	7.002	6.935	6.876	6.818	6.755	6.693	6.628	6.569	6.512
15	9.824	9.668	9.525	9.387	9.253	9.127	9.003	8.88	8.769	8.658
20	11.957	11.724	11.515	11.317	11.14	10.949	10.755	10.594	10.417	10.251
25	13.508	13.214	12.95	12.707	12.465	12.253	12.049	11.832	11.633	11.453
30	14.759	14.4	14.093	13.805	13.523	13.249	13.029	12.799	12.576	12.375
35	15.794	15.445	15.084	14.761	14.436	14.162	13.884	13.64	13.404	13.186
40	16.598	16.171	15.783	15.449	15.109	14.815	14.522	14.25	13.977	13.75
45	17.447	17.017	16.605	16.222	15.864	15.509	15.213	14.936	14.657	14.381
50	17.977	17.51	17.074	16.693	16.331	15.976	15.645	15.347	15.089	14.839

Sample	Significance Level (1-α)									
Size	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	3.142	3.129	3.114	3.099	3.083	3.068	3.052	3.034	3.016	2.997
10	6.394	6.272	6.167	6.054	5.947	5.834	5.73	5.629	5.526	5.434
15	8.439	8.232	8.03	7.836	7.658	7.485	7.314	7.145	6.995	6.844
20	9.962	9.688	9.425	9.176	8.953	8.742	8.536	8.348	8.164	7.986
25	11.082	10.781	10.465	10.183	9.929	9.681	9.452	9.224	9.033	8.847
30	11.961	11.614	11.291	10.998	10.713	10.447	10.219	9.989	9.763	9.561
35	12.764	12.372	12.037	11.714	11.407	11.136	10.871	10.621	10.391	10.17
40	13.298	12.887	12.522	12.198	11.881	11.579	11.304	11.055	10.818	10.597
45	13.903	13.468	13.081	12.725	12.389	12.094	11.821	11.544	11.303	11.067
50	14.366	13.949	13.557	13.191	12.856	12.538	12.242	11.986	11.725	11.482

Table A.19 Kurtosis (b_2) Lower Tail Critical Values: $\beta = 1.0$

Sample Size	Significance Level (α)									
	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	1.185	1.196	1.207	1.216	1.224	1.232	1.239	1.246	1.252	1.257
10	1.297	1.351	1.386	1.419	1.446	1.469	1.491	1.514	1.533	1.551
15	1.447	1.515	1.564	1.6	1.635	1.665	1.692	1.718	1.741	1.765
20	1.59	1.664	1.721	1.766	1.804	1.84	1.872	1.9	1.927	1.954
25	1.712	1.793	1.855	1.904	1.95	1.988	2.027	2.063	2.097	2.131
30	1.808	1.91	1.98	2.039	2.095	2.143	2.184	2.222	2.255	2.29
35	1.921	2.037	2.116	2.181	2.237	2.287	2.333	2.373	2.411	2.448
40	2.014	2.133	2.222	2.286	2.34	2.393	2.441	2.486	2.529	2.567
45	2.114	2.237	2.325	2.402	2.464	2.517	2.568	2.615	2.662	2.705
50	2.204	2.331	2.424	2.499	2.56	2.618	2.669	2.715	2.759	2.798

Sample Size	Significance Level (α)									
	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	1.262	1.268	1.274	1.28	1.286	1.292	1.298	1.305	1.311	1.318
10	1.569	1.585	1.6	1.616	1.631	1.644	1.658	1.672	1.685	1.698
15	1.786	1.808	1.828	1.846	1.865	1.883	1.9	1.918	1.935	1.954
20	1.983	2.008	2.033	2.056	2.078	2.099	2.121	2.145	2.166	2.188
25	2.161	2.19	2.219	2.248	2.274	2.3	2.323	2.347	2.373	2.398
30	2.322	2.356	2.384	2.414	2.443	2.471	2.498	2.524	2.549	2.574
35	2.483	2.515	2.548	2.581	2.613	2.645	2.674	2.701	2.729	2.755
40	2.603	2.64	2.674	2.706	2.739	2.772	2.8	2.829	2.857	2.884
45	2.742	2.779	2.813	2.845	2.877	2.908	2.936	2.965	2.993	3.022
50	2.836	2.877	2.912	2.947	2.98	3.013	3.043	3.072	3.101	3.131

Sample Size	Significance Level (α)									
	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	1.332	1.346	1.36	1.376	1.391	1.407	1.423	1.439	1.456	1.472
10	1.723	1.747	1.771	1.793	1.816	1.839	1.862	1.884	1.906	1.929
15	1.989	2.019	2.051	2.081	2.114	2.148	2.179	2.213	2.242	2.275
20	2.23	2.27	2.309	2.35	2.387	2.423	2.463	2.498	2.536	2.573
25	2.443	2.484	2.528	2.57	2.613	2.655	2.695	2.735	2.776	2.817
30	2.625	2.678	2.726	2.772	2.816	2.86	2.903	2.949	2.991	3.033
35	2.806	2.859	2.909	2.956	3.003	3.05	3.097	3.142	3.188	3.234
40	2.94	2.992	3.042	3.094	3.149	3.197	3.244	3.289	3.335	3.38
45	3.08	3.134	3.184	3.235	3.285	3.337	3.386	3.434	3.482	3.526
50	3.192	3.248	3.303	3.357	3.41	3.457	3.508	3.557	3.605	3.657

Table A.20 Kurtosis (b_2) Upper Tail Critical Values: $\beta = 1.0$

Sample	Significance Level (1-α)									
Size	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	3.231	3.22	3.208	3.196	3.184	3.172	3.16	3.149	3.137	3.125
10	7.472	7.242	7.062	6.917	6.783	6.668	6.556	6.448	6.354	6.25
15	10.876	10.28	9.812	9.47	9.178	8.941	8.708	8.493	8.296	8.114
20	13.601	12.61	11.885	11.395	10.958	10.584	10.251	9.974	9.724	9.463
25	15.523	14.218	13.377	12.751	12.229	11.764	11.383	11.008	10.681	10.353
30	17.57	15.831	14.736	13.879	13.224	12.67	12.168	11.785	11.425	11.093
35	18.671	16.669	15.524	14.657	13.93	13.3	12.8	12.319	11.94	11.574
40	19.964	17.869	16.51	15.5	14.673	14.023	13.486	12.965	12.555	12.18
45	21.008	18.392	16.864	15.827	15.049	14.354	13.806	13.314	12.878	12.517
50	21.684	19.038	17.43	16.294	15.457	14.691	14.063	13.565	13.117	12.679

Sample	Significance Level (1-α)									
Size	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	3.113	3.102	3.09	3.079	3.067	3.055	3.044	3.032	3.021	3.009
10	6.156	6.063	5.982	5.893	5.813	5.736	5.664	5.595	5.527	5.457
15	7.942	7.785	7.632	7.487	7.362	7.234	7.115	7.003	6.893	6.784
20	9.232	9.028	8.836	8.653	8.475	8.31	8.148	8.011	7.873	7.741
25	10.101	9.836	9.624	9.399	9.19	9.011	8.849	8.689	8.531	8.395
30	10.806	10.533	10.29	10.059	9.856	9.656	9.474	9.292	9.127	8.971
35	11.27	10.983	10.732	10.49	10.273	10.053	9.86	9.69	9.504	9.337
40	11.811	11.482	11.221	10.967	10.738	10.517	10.307	10.098	9.91	9.75
45	12.185	11.859	11.555	11.285	11.06	10.834	10.622	10.423	10.229	10.067
50	12.32	12.007	11.722	11.446	11.197	10.976	10.781	10.571	10.384	10.215

Sample	Significance Level (1-α)									
Size	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	2.985	2.961	2.936	2.911	2.886	2.861	2.836	2.811	2.785	2.762
10	5.33	5.2	5.076	4.961	4.848	4.742	4.646	4.55	4.458	4.362
15	6.581	6.387	6.205	6.041	5.892	5.754	5.619	5.494	5.379	5.267
20	7.497	7.27	7.061	6.883	6.711	6.557	6.409	6.268	6.136	6.01
25	8.139	7.903	7.68	7.479	7.297	7.125	6.955	6.795	6.652	6.512
30	8.682	8.421	8.183	7.973	7.762	7.578	7.408	7.243	7.084	6.93
35	9.044	8.772	8.538	8.313	8.103	7.897	7.717	7.546	7.383	7.23
40	9.434	9.15	8.891	8.648	8.429	8.213	8.018	7.841	7.676	7.517
45	9.743	9.433	9.168	8.933	8.721	8.504	8.303	8.12	7.947	7.789
50	9.872	9.588	9.328	9.101	8.877	8.661	8.47	8.281	8.105	7.951

Table A.21 Kurtosis (b_2) Lower Tail Critical Values: $\beta = 1.5$

Sample	Significance Level (α)									
Size	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	1.189	1.203	1.214	1.223	1.232	1.24	1.247	1.253	1.259	1.265
10	1.302	1.358	1.393	1.423	1.449	1.471	1.491	1.511	1.528	1.545
15	1.453	1.512	1.553	1.587	1.616	1.642	1.665	1.686	1.708	1.728
20	1.567	1.634	1.683	1.722	1.754	1.786	1.81	1.835	1.856	1.879
25	1.662	1.736	1.791	1.834	1.872	1.902	1.932	1.959	1.988	2.011
30	1.745	1.828	1.887	1.934	1.973	2.009	2.042	2.073	2.101	2.126
35	1.825	1.919	1.979	2.033	2.077	2.116	2.15	2.183	2.214	2.244
40	1.897	1.992	2.064	2.118	2.162	2.202	2.242	2.276	2.308	2.339
45	1.967	2.068	2.137	2.195	2.245	2.287	2.327	2.362	2.397	2.43
50	2.039	2.142	2.216	2.273	2.324	2.367	2.405	2.445	2.48	2.513

Sample	Significance Level (α)									
Size	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	1.271	1.277	1.284	1.29	1.296	1.302	1.309	1.316	1.322	1.329
10	1.56	1.575	1.589	1.603	1.618	1.63	1.642	1.653	1.664	1.677
15	1.747	1.765	1.781	1.798	1.813	1.828	1.843	1.859	1.874	1.888
20	1.9	1.92	1.94	1.957	1.976	1.995	2.014	2.031	2.048	2.064
25	2.034	2.058	2.08	2.1	2.121	2.142	2.161	2.181	2.201	2.218
30	2.153	2.178	2.203	2.227	2.249	2.274	2.297	2.318	2.339	2.359
35	2.272	2.297	2.322	2.347	2.37	2.393	2.417	2.439	2.461	2.48
40	2.37	2.397	2.422	2.448	2.472	2.497	2.52	2.544	2.566	2.589
45	2.46	2.489	2.519	2.546	2.574	2.597	2.622	2.647	2.67	2.693
50	2.545	2.574	2.602	2.63	2.656	2.682	2.707	2.732	2.757	2.781

Sample	Significance Level (α)									
Size	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	1.343	1.357	1.371	1.386	1.4	1.416	1.431	1.446	1.462	1.477
10	1.699	1.721	1.741	1.761	1.782	1.802	1.821	1.84	1.86	1.879
15	1.916	1.944	1.97	1.996	2.023	2.048	2.074	2.099	2.123	2.148
20	2.097	2.128	2.159	2.189	2.22	2.25	2.28	2.311	2.34	2.368
25	2.256	2.292	2.327	2.361	2.393	2.426	2.458	2.489	2.522	2.552
30	2.4	2.438	2.476	2.511	2.547	2.582	2.617	2.652	2.684	2.718
35	2.522	2.563	2.603	2.643	2.679	2.717	2.754	2.792	2.829	2.862
40	2.63	2.671	2.714	2.754	2.793	2.829	2.866	2.904	2.941	2.977
45	2.74	2.782	2.824	2.866	2.905	2.944	2.983	3.02	3.058	3.097
50	2.827	2.868	2.908	2.952	2.992	3.031	3.073	3.113	3.151	3.189

Table A.22 Kurtosis (b_2) Upper Tail Critical Values: $\beta = 1.5$

Sample	Significance Level (1-α)									
Size	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	3.219	3.196	3.177	3.159	3.143	3.127	3.111	3.096	3.08	3.066
10	7.17	6.886	6.652	6.465	6.326	6.184	6.057	5.95	5.847	5.739
15	10.101	9.402	8.95	8.588	8.296	8.031	7.807	7.605	7.416	7.236
20	12.286	11.207	10.525	9.999	9.583	9.237	8.934	8.639	8.396	8.165
25	13.963	12.586	11.713	11.049	10.52	10.116	9.718	9.403	9.106	8.846
30	15.164	13.447	12.458	11.785	11.182	10.701	10.326	9.962	9.639	9.366
35	16.172	14.304	13.182	12.304	11.619	11.134	10.722	10.346	10.019	9.726
40	16.88	14.861	13.673	12.796	12.041	11.483	11.051	10.646	10.319	10.011
45	17.643	15.391	13.961	13.041	12.406	11.801	11.313	10.921	10.558	10.234
50	18.303	15.904	14.512	13.413	12.649	12.072	11.575	11.14	10.77	10.451

Sample	Significance Level (1-α)									
Size	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	3.051	3.036	3.022	3.006	2.993	2.978	2.964	2.949	2.936	2.923
10	5.646	5.554	5.462	5.379	5.299	5.22	5.15	5.08	5.011	4.941
15	7.06	6.897	6.76	6.627	6.49	6.37	6.258	6.157	6.053	5.955
20	7.953	7.759	7.59	7.43	7.273	7.135	7.003	6.885	6.778	6.667
25	8.62	8.386	8.184	7.999	7.833	7.68	7.534	7.392	7.259	7.139
30	9.092	8.858	8.67	8.471	8.289	8.131	7.977	7.813	7.677	7.538
35	9.441	9.229	9	8.806	8.61	8.432	8.268	8.114	7.965	7.835
40	9.745	9.497	9.265	9.068	8.878	8.681	8.519	8.359	8.215	8.071
45	9.966	9.721	9.485	9.274	9.078	8.891	8.716	8.554	8.397	8.256
50	10.159	9.895	9.658	9.454	9.255	9.065	8.889	8.721	8.564	8.417

Sample	Significance Level (1-α)									
Size	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	2.895	2.868	2.84	2.814	2.788	2.763	2.737	2.71	2.684	2.66
10	4.816	4.695	4.585	4.479	4.373	4.279	4.187	4.101	4.017	3.94
15	5.774	5.604	5.46	5.319	5.191	5.069	4.954	4.845	4.745	4.648
20	6.472	6.29	6.122	5.957	5.808	5.67	5.544	5.425	5.315	5.208
25	6.929	6.716	6.52	6.348	6.194	6.057	5.921	5.792	5.675	5.561
30	7.299	7.089	6.896	6.722	6.554	6.403	6.251	6.113	5.993	5.868
35	7.59	7.372	7.166	6.987	6.806	6.643	6.495	6.36	6.226	6.104
40	7.826	7.596	7.392	7.196	7.017	6.849	6.701	6.558	6.427	6.301
45	7.995	7.76	7.552	7.367	7.195	7.03	6.875	6.737	6.6	6.474
50	8.148	7.908	7.681	7.49	7.304	7.137	6.986	6.84	6.698	6.569

Table A.23 Kurtosis (b_2) Lower Tail Critical Values: $\beta = 2.0$

Sample Size	Significance Level (α)									
	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	1.189	1.204	1.215	1.224	1.234	1.242	1.249	1.255	1.262	1.268
10	1.319	1.364	1.397	1.428	1.454	1.478	1.498	1.517	1.532	1.547
15	1.455	1.518	1.557	1.587	1.616	1.641	1.662	1.683	1.702	1.72
20	1.562	1.625	1.669	1.704	1.736	1.763	1.789	1.811	1.832	1.85
25	1.657	1.724	1.773	1.813	1.846	1.874	1.9	1.924	1.949	1.971
30	1.728	1.804	1.857	1.9	1.933	1.964	1.993	2.018	2.042	2.066
35	1.808	1.885	1.939	1.983	2.023	2.054	2.082	2.108	2.131	2.154
40	1.866	1.944	2.001	2.05	2.091	2.124	2.158	2.186	2.213	2.239
45	1.929	2.015	2.076	2.121	2.161	2.199	2.231	2.264	2.291	2.316
50	1.983	2.073	2.138	2.189	2.227	2.265	2.3	2.332	2.361	2.389

Sample Size	Significance Level (α)									
	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	1.274	1.281	1.287	1.293	1.299	1.305	1.312	1.319	1.326	1.332
10	1.562	1.576	1.59	1.602	1.614	1.626	1.638	1.65	1.66	1.671
15	1.736	1.753	1.767	1.782	1.796	1.809	1.823	1.836	1.85	1.863
20	1.869	1.887	1.904	1.921	1.937	1.954	1.967	1.981	1.996	2.01
25	1.991	2.009	2.026	2.045	2.062	2.08	2.097	2.113	2.13	2.146
30	2.089	2.11	2.132	2.151	2.169	2.187	2.207	2.226	2.243	2.261
35	2.178	2.2	2.22	2.242	2.263	2.282	2.301	2.321	2.338	2.355
40	2.263	2.287	2.311	2.333	2.355	2.376	2.397	2.416	2.434	2.451
45	2.34	2.364	2.389	2.412	2.433	2.454	2.475	2.496	2.516	2.534
50	2.415	2.441	2.466	2.489	2.511	2.532	2.554	2.574	2.595	2.615

Sample Size	Significance Level (α)									
	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	1.346	1.359	1.374	1.389	1.403	1.418	1.434	1.448	1.463	1.479
10	1.692	1.712	1.732	1.752	1.771	1.789	1.806	1.825	1.844	1.861
15	1.888	1.912	1.935	1.959	1.982	2.003	2.026	2.048	2.07	2.092
20	2.038	2.066	2.094	2.119	2.146	2.171	2.196	2.223	2.248	2.272
25	2.177	2.208	2.238	2.269	2.297	2.324	2.352	2.381	2.409	2.435
30	2.295	2.326	2.358	2.39	2.421	2.452	2.484	2.514	2.544	2.574
35	2.391	2.425	2.457	2.49	2.523	2.555	2.584	2.615	2.645	2.676
40	2.486	2.522	2.554	2.588	2.623	2.656	2.688	2.72	2.754	2.786
45	2.572	2.609	2.647	2.68	2.716	2.749	2.785	2.818	2.85	2.883
50	2.654	2.693	2.73	2.766	2.799	2.835	2.868	2.901	2.932	2.964

Table A.24 Kurtosis (b_2) Upper Tail Critical Values: $\beta = 2.0$

Sample Size	Significance Level (1-α)									
	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	3.209	3.181	3.159	3.139	3.119	3.099	3.08	3.063	3.046	3.029
10	7	6.644	6.407	6.22	6.048	5.891	5.754	5.64	5.527	5.425
15	9.663	8.935	8.415	8.057	7.74	7.462	7.222	7.006	6.814	6.65
20	11.432	10.39	9.683	9.179	8.765	8.421	8.128	7.877	7.654	7.443
25	12.729	11.376	10.565	9.926	9.443	9.06	8.734	8.439	8.177	7.928
30	13.709	12.153	11.175	10.475	9.93	9.484	9.126	8.801	8.535	8.273
35	14.562	12.863	11.787	10.993	10.446	9.966	9.549	9.191	8.898	8.648
40	14.837	12.965	11.917	11.073	10.513	10.058	9.673	9.344	9.047	8.791
45	15.478	13.547	12.349	11.555	10.914	10.411	9.989	9.633	9.303	9.036
50	15.705	13.624	12.43	11.634	10.947	10.436	10.017	9.676	9.359	9.104

Sample Size	Significance Level (1-α)									
	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	3.012	2.996	2.979	2.962	2.946	2.931	2.917	2.902	2.887	2.872
10	5.328	5.236	5.15	5.067	4.987	4.907	4.832	4.759	4.693	4.625
15	6.487	6.343	6.225	6.101	5.979	5.873	5.769	5.671	5.578	5.485
20	7.244	7.083	6.918	6.754	6.615	6.483	6.358	6.246	6.135	6.037
25	7.721	7.53	7.352	7.178	7.032	6.885	6.767	6.647	6.525	6.426
30	8.06	7.869	7.688	7.526	7.363	7.215	7.082	6.966	6.845	6.737
35	8.409	8.205	8.025	7.852	7.685	7.531	7.367	7.237	7.11	6.989
40	8.559	8.345	8.156	7.965	7.787	7.628	7.48	7.343	7.218	7.107
45	8.778	8.544	8.346	8.153	7.976	7.818	7.678	7.551	7.417	7.298
50	8.863	8.63	8.428	8.242	8.074	7.921	7.778	7.646	7.519	7.402

Sample Size	Significance Level (1-α)									
	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	2.844	2.814	2.787	2.76	2.734	2.708	2.684	2.659	2.635	2.611
10	4.5	4.387	4.28	4.176	4.079	3.986	3.904	3.823	3.748	3.676
15	5.308	5.154	5.015	4.891	4.77	4.662	4.551	4.456	4.365	4.283
20	5.85	5.686	5.532	5.398	5.266	5.145	5.029	4.926	4.821	4.728
25	6.235	6.051	5.89	5.746	5.61	5.485	5.358	5.246	5.143	5.045
30	6.533	6.343	6.17	6.019	5.876	5.743	5.624	5.51	5.399	5.292
35	6.786	6.586	6.404	6.24	6.096	5.96	5.83	5.708	5.597	5.488
40	6.893	6.706	6.532	6.374	6.214	6.075	5.943	5.822	5.709	5.605
45	7.086	6.88	6.7	6.538	6.371	6.23	6.097	5.968	5.855	5.747
50	7.179	6.978	6.792	6.627	6.475	6.333	6.197	6.077	5.958	5.85

Table A.25 Kurtosis (b_2) Lower Tail Critical Values: $\beta = 2.5$

Sample Size	Significance Level (α)									
	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	1.19	1.205	1.218	1.228	1.236	1.245	1.251	1.257	1.263	1.269
10	1.317	1.367	1.404	1.433	1.457	1.478	1.498	1.515	1.532	1.548
15	1.454	1.513	1.551	1.581	1.608	1.63	1.652	1.672	1.69	1.707
20	1.571	1.628	1.669	1.703	1.733	1.759	1.782	1.803	1.822	1.84
25	1.655	1.721	1.764	1.8	1.832	1.858	1.88	1.904	1.924	1.945
30	1.724	1.792	1.838	1.877	1.909	1.94	1.967	1.99	2.013	2.035
35	1.791	1.868	1.918	1.958	1.991	2.02	2.046	2.071	2.093	2.114
40	1.847	1.927	1.976	2.017	2.053	2.083	2.111	2.14	2.164	2.187
45	1.907	1.984	2.037	2.081	2.12	2.153	2.183	2.209	2.233	2.257
50	1.953	2.035	2.091	2.138	2.176	2.21	2.24	2.267	2.293	2.316

Sample Size	Significance Level (α)									
	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	1.275	1.281	1.288	1.295	1.302	1.308	1.315	1.322	1.329	1.335
10	1.563	1.577	1.59	1.603	1.616	1.628	1.639	1.65	1.661	1.673
15	1.724	1.74	1.755	1.769	1.782	1.796	1.808	1.821	1.832	1.844
20	1.857	1.874	1.89	1.906	1.921	1.935	1.95	1.963	1.977	1.991
25	1.964	1.981	1.997	2.013	2.03	2.045	2.06	2.074	2.089	2.104
30	2.054	2.073	2.092	2.109	2.126	2.143	2.157	2.173	2.189	2.204
35	2.134	2.155	2.174	2.192	2.211	2.229	2.247	2.263	2.278	2.295
40	2.209	2.23	2.25	2.269	2.288	2.307	2.324	2.341	2.359	2.374
45	2.281	2.302	2.323	2.344	2.365	2.384	2.403	2.421	2.438	2.454
50	2.34	2.362	2.383	2.403	2.423	2.442	2.461	2.48	2.498	2.515

Sample Size	Significance Level (α)									
	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	1.348	1.362	1.377	1.392	1.407	1.421	1.436	1.45	1.465	1.48
10	1.693	1.712	1.731	1.749	1.767	1.786	1.803	1.819	1.836	1.853
15	1.868	1.891	1.913	1.934	1.955	1.976	1.997	2.017	2.036	2.057
20	2.018	2.043	2.066	2.09	2.113	2.135	2.159	2.182	2.204	2.227
25	2.131	2.159	2.187	2.212	2.239	2.264	2.287	2.313	2.337	2.36
30	2.233	2.264	2.292	2.32	2.346	2.374	2.4	2.426	2.453	2.48
35	2.327	2.36	2.391	2.421	2.448	2.475	2.503	2.529	2.557	2.583
40	2.406	2.437	2.469	2.499	2.529	2.558	2.587	2.615	2.644	2.671
45	2.487	2.52	2.552	2.585	2.615	2.644	2.673	2.701	2.73	2.755
50	2.55	2.582	2.615	2.646	2.677	2.708	2.739	2.769	2.799	2.826

Table A.26 Kurtosis (b_2) Upper Tail Critical Values: $\beta = 2.5$

Sample Size	Significance Level (1-α)									
	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	3.201	3.171	3.145	3.121	3.1	3.08	3.06	3.041	3.021	3.004
10	6.802	6.439	6.184	5.98	5.812	5.672	5.533	5.409	5.292	5.188
15	9.287	8.534	8.054	7.68	7.377	7.107	6.879	6.664	6.474	6.304
20	10.695	9.725	9.087	8.617	8.214	7.886	7.591	7.339	7.122	6.937
25	11.929	10.647	9.816	9.255	8.769	8.405	8.077	7.8	7.539	7.324
30	12.696	11.19	10.349	9.719	9.204	8.777	8.467	8.161	7.907	7.683
35	13.26	11.741	10.786	10.079	9.553	9.137	8.751	8.435	8.173	7.926
40	13.808	11.997	10.965	10.275	9.735	9.265	8.879	8.576	8.309	8.061
45	13.835	12.089	11.117	10.379	9.805	9.356	8.986	8.683	8.446	8.2
50	14.129	12.233	11.178	10.404	9.851	9.402	9.034	8.751	8.472	8.23

Sample Size	Significance Level (1-α)									
	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	2.985	2.969	2.952	2.935	2.919	2.903	2.886	2.871	2.856	2.842
10	5.09	4.997	4.909	4.828	4.751	4.672	4.601	4.533	4.469	4.404
15	6.153	6.004	5.88	5.76	5.646	5.535	5.419	5.326	5.241	5.154
20	6.764	6.597	6.452	6.311	6.193	6.076	5.971	5.865	5.769	5.675
25	7.128	6.961	6.793	6.645	6.518	6.389	6.267	6.16	6.061	5.962
30	7.463	7.269	7.106	6.95	6.801	6.668	6.551	6.438	6.327	6.224
35	7.693	7.507	7.325	7.155	6.996	6.882	6.756	6.635	6.525	6.423
40	7.856	7.667	7.49	7.326	7.165	7.023	6.9	6.776	6.665	6.561
45	7.984	7.783	7.602	7.428	7.269	7.122	6.991	6.868	6.745	6.642
50	8.017	7.822	7.64	7.473	7.321	7.174	7.05	6.927	6.815	6.712

Sample Size	Significance Level (1-α)									
	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	2.811	2.783	2.755	2.728	2.701	2.675	2.649	2.624	2.601	2.577
10	4.295	4.188	4.085	3.985	3.896	3.814	3.736	3.66	3.592	3.524
15	5.001	4.861	4.741	4.618	4.508	4.407	4.312	4.226	4.138	4.059
20	5.505	5.351	5.212	5.077	4.956	4.841	4.732	4.633	4.542	4.457
25	5.779	5.613	5.468	5.334	5.207	5.091	4.98	4.879	4.784	4.689
30	6.035	5.858	5.703	5.555	5.424	5.299	5.181	5.079	4.979	4.885
35	6.225	6.049	5.886	5.739	5.604	5.481	5.364	5.256	5.153	5.057
40	6.36	6.174	6.015	5.873	5.735	5.613	5.489	5.383	5.276	5.182
45	6.441	6.266	6.101	5.955	5.818	5.694	5.583	5.478	5.374	5.282
50	6.521	6.351	6.183	6.044	5.906	5.783	5.677	5.566	5.46	5.363

Table A.27 Kurtosis (b_2) Lower Tail Critical Values: $\beta = 3.0$

Sample	Significance Level (α)									
Size	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	1.191	1.206	1.218	1.229	1.238	1.246	1.252	1.259	1.265	1.271
10	1.317	1.37	1.403	1.432	1.455	1.478	1.497	1.515	1.531	1.547
15	1.464	1.519	1.56	1.591	1.617	1.639	1.659	1.676	1.694	1.712
20	1.568	1.626	1.667	1.7	1.727	1.753	1.777	1.799	1.817	1.836
25	1.654	1.716	1.759	1.791	1.822	1.846	1.872	1.893	1.913	1.932
30	1.726	1.792	1.837	1.873	1.902	1.929	1.953	1.976	1.999	2.02
35	1.792	1.857	1.907	1.943	1.975	2.002	2.029	2.053	2.073	2.094
40	1.839	1.908	1.955	1.995	2.028	2.054	2.079	2.105	2.128	2.151
45	1.891	1.965	2.015	2.057	2.093	2.123	2.15	2.175	2.198	2.22
50	1.941	2.014	2.064	2.107	2.143	2.172	2.202	2.226	2.249	2.27

Sample	Significance Level (α)									
Size	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	1.278	1.284	1.291	1.297	1.304	1.311	1.317	1.324	1.331	1.337
10	1.562	1.576	1.589	1.601	1.613	1.625	1.637	1.648	1.659	1.669
15	1.727	1.742	1.756	1.769	1.782	1.794	1.806	1.818	1.831	1.842
20	1.854	1.869	1.884	1.898	1.912	1.927	1.941	1.955	1.968	1.98
25	1.949	1.966	1.982	1.997	2.012	2.027	2.041	2.055	2.069	2.082
30	2.039	2.056	2.073	2.089	2.105	2.121	2.135	2.149	2.164	2.178
35	2.114	2.132	2.15	2.166	2.183	2.199	2.214	2.23	2.245	2.26
40	2.17	2.19	2.207	2.225	2.242	2.259	2.275	2.29	2.306	2.321
45	2.241	2.262	2.281	2.298	2.316	2.332	2.349	2.366	2.382	2.397
50	2.291	2.313	2.332	2.352	2.37	2.388	2.406	2.421	2.438	2.455

Sample	Significance Level (α)									
Size	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	1.351	1.365	1.379	1.393	1.409	1.423	1.437	1.452	1.466	1.482
10	1.689	1.707	1.725	1.743	1.761	1.778	1.795	1.812	1.828	1.844
15	1.865	1.886	1.908	1.927	1.948	1.968	1.988	2.006	2.026	2.044
20	2.005	2.028	2.051	2.074	2.095	2.117	2.138	2.16	2.181	2.202
25	2.108	2.132	2.156	2.181	2.205	2.228	2.25	2.272	2.294	2.316
30	2.206	2.232	2.257	2.285	2.309	2.334	2.36	2.385	2.408	2.433
35	2.289	2.315	2.342	2.369	2.397	2.422	2.447	2.472	2.497	2.521
40	2.351	2.381	2.41	2.438	2.464	2.492	2.517	2.542	2.568	2.595
45	2.426	2.457	2.485	2.513	2.54	2.566	2.591	2.619	2.644	2.67
50	2.486	2.515	2.545	2.573	2.601	2.627	2.656	2.683	2.708	2.734

Table A.28 Kurtosis (b_2) Upper Tail Critical Values: $\beta = 3.0$

Sample Size	Significance Level (1-α)									
	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	3.196	3.164	3.136	3.11	3.088	3.066	3.045	3.024	3.005	2.986
10	6.674	6.327	6.039	5.84	5.661	5.5	5.369	5.24	5.129	5.029
15	8.881	8.09	7.636	7.259	6.965	6.731	6.516	6.323	6.154	5.998
20	10.104	9.155	8.591	8.116	7.77	7.462	7.213	6.967	6.767	6.59
25	11.339	10.08	9.259	8.699	8.283	7.91	7.614	7.354	7.13	6.93
30	12	10.611	9.774	9.126	8.651	8.265	7.933	7.649	7.417	7.204
35	12.513	10.843	9.921	9.293	8.799	8.434	8.112	7.84	7.587	7.36
40	12.79	11.072	10.072	9.463	8.968	8.609	8.282	7.997	7.761	7.523
45	13.077	11.303	10.403	9.737	9.178	8.765	8.413	8.11	7.862	7.636
50	13.117	11.4	10.434	9.77	9.218	8.752	8.405	8.119	7.877	7.641

Sample Size	Significance Level (1-α)									
	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	2.969	2.95	2.932	2.915	2.899	2.882	2.865	2.849	2.833	2.817
10	4.926	4.83	4.749	4.663	4.587	4.509	4.441	4.374	4.313	4.259
15	5.842	5.717	5.596	5.484	5.376	5.275	5.182	5.095	5.012	4.937
20	6.421	6.269	6.129	5.997	5.869	5.754	5.651	5.554	5.457	5.367
25	6.753	6.592	6.424	6.284	6.166	6.043	5.935	5.831	5.733	5.647
30	7.013	6.826	6.659	6.526	6.39	6.269	6.15	6.049	5.942	5.848
35	7.172	6.995	6.824	6.686	6.546	6.423	6.304	6.193	6.092	5.995
40	7.321	7.146	6.983	6.833	6.698	6.57	6.454	6.342	6.234	6.141
45	7.431	7.257	7.086	6.924	6.788	6.659	6.531	6.424	6.313	6.214
50	7.431	7.249	7.09	6.947	6.819	6.699	6.591	6.488	6.388	6.294

Sample Size	Significance Level (1-α)									
	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	2.786	2.757	2.728	2.701	2.674	2.648	2.622	2.598	2.575	2.552
10	4.149	4.043	3.944	3.854	3.769	3.689	3.62	3.547	3.478	3.415
15	4.793	4.662	4.541	4.431	4.332	4.236	4.145	4.063	3.983	3.909
20	5.207	5.065	4.934	4.809	4.695	4.588	4.488	4.405	4.319	4.242
25	5.479	5.328	5.186	5.059	4.941	4.829	4.725	4.633	4.545	4.464
30	5.68	5.531	5.382	5.251	5.131	5.015	4.908	4.816	4.725	4.643
35	5.822	5.664	5.522	5.393	5.279	5.169	5.059	4.961	4.87	4.786
40	5.963	5.798	5.649	5.511	5.388	5.27	5.164	5.067	4.975	4.885
45	6.033	5.876	5.727	5.597	5.472	5.356	5.251	5.149	5.055	4.97
50	6.112	5.958	5.812	5.683	5.558	5.446	5.344	5.246	5.15	5.064

Table A.29 Kurtosis (b_2) Lower Tail Critical Values: $\beta = 3.5$

Sample Size	Significance Level (α) 0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	1.192	1.207	1.219	1.23	1.239	1.247	1.254	1.26	1.266	1.272
10	1.32	1.372	1.408	1.435	1.46	1.48	1.499	1.517	1.534	1.549
15	1.466	1.522	1.562	1.593	1.62	1.644	1.663	1.682	1.699	1.715
20	1.564	1.624	1.666	1.7	1.729	1.753	1.774	1.794	1.813	1.83
25	1.658	1.717	1.76	1.793	1.82	1.847	1.87	1.891	1.911	1.93
30	1.726	1.787	1.829	1.866	1.894	1.92	1.944	1.966	1.985	2.004
35	1.781	1.851	1.901	1.934	1.964	1.989	2.015	2.038	2.06	2.079
40	1.837	1.906	1.951	1.99	2.02	2.048	2.073	2.095	2.116	2.136
45	1.888	1.96	2.011	2.048	2.081	2.111	2.137	2.159	2.18	2.198
50	1.933	2.002	2.048	2.087	2.12	2.151	2.178	2.202	2.224	2.244

Sample Size	Significance Level (α) 0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	1.279	1.286	1.292	1.298	1.305	1.312	1.318	1.325	1.332	1.339
10	1.563	1.576	1.59	1.603	1.614	1.626	1.637	1.648	1.658	1.669
15	1.73	1.745	1.759	1.773	1.785	1.798	1.81	1.822	1.833	1.844
20	1.846	1.863	1.878	1.893	1.907	1.921	1.934	1.948	1.961	1.972
25	1.946	1.962	1.976	1.991	2.006	2.019	2.033	2.046	2.059	2.072
30	2.02	2.037	2.054	2.068	2.084	2.099	2.113	2.128	2.142	2.155
35	2.097	2.113	2.13	2.145	2.161	2.176	2.19	2.205	2.219	2.233
40	2.154	2.172	2.188	2.206	2.223	2.24	2.255	2.269	2.283	2.297
45	2.218	2.236	2.255	2.271	2.288	2.303	2.318	2.333	2.349	2.364
50	2.265	2.283	2.302	2.32	2.337	2.354	2.37	2.385	2.4	2.416

Sample Size	Significance Level (α) 0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	1.353	1.367	1.382	1.397	1.411	1.426	1.441	1.456	1.47	1.485
10	1.689	1.708	1.726	1.744	1.76	1.776	1.795	1.812	1.829	1.846
15	1.866	1.887	1.907	1.928	1.948	1.968	1.987	2.005	2.024	2.042
20	1.996	2.019	2.041	2.062	2.083	2.104	2.124	2.143	2.163	2.183
25	2.098	2.121	2.144	2.167	2.189	2.211	2.233	2.254	2.275	2.297
30	2.183	2.207	2.231	2.255	2.277	2.3	2.323	2.347	2.368	2.39
35	2.26	2.286	2.312	2.337	2.361	2.384	2.406	2.431	2.454	2.476
40	2.325	2.352	2.379	2.404	2.431	2.455	2.48	2.504	2.529	2.553
45	2.392	2.421	2.447	2.473	2.498	2.523	2.548	2.572	2.598	2.621
50	2.445	2.473	2.499	2.525	2.551	2.576	2.6	2.624	2.649	2.672

Table A.30 Kurtosis (b_2) Upper Tail Critical Values: $\beta = 3.5$

Sample Size	Significance Level (1-α)									
	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	3.195	3.158	3.128	3.103	3.079	3.057	3.035	3.014	2.995	2.975
10	6.568	6.166	5.914	5.704	5.531	5.375	5.221	5.1	4.993	4.895
15	8.586	7.855	7.396	7.025	6.749	6.508	6.297	6.102	5.93	5.782
20	9.955	8.962	8.297	7.827	7.467	7.174	6.888	6.655	6.459	6.267
25	10.719	9.485	8.746	8.186	7.79	7.471	7.185	6.949	6.731	6.549
30	11.285	9.982	9.195	8.61	8.192	7.83	7.509	7.243	7.019	6.823
35	11.943	10.329	9.433	8.843	8.369	7.995	7.698	7.444	7.202	7
40	11.973	10.462	9.565	8.958	8.494	8.118	7.809	7.525	7.283	7.061
45	12.3	10.686	9.792	9.136	8.654	8.273	7.946	7.666	7.417	7.201
50	12.272	10.613	9.728	9.083	8.608	8.225	7.898	7.634	7.404	7.21

Sample Size	Significance Level (1-α)									
	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	2.956	2.937	2.918	2.9	2.883	2.865	2.849	2.833	2.818	2.801
10	4.799	4.706	4.62	4.542	4.471	4.395	4.325	4.263	4.203	4.144
15	5.647	5.529	5.403	5.293	5.18	5.086	4.999	4.912	4.833	4.757
20	6.112	5.985	5.849	5.73	5.614	5.511	5.413	5.315	5.227	5.144
25	6.387	6.243	6.106	5.979	5.867	5.756	5.654	5.563	5.476	5.393
30	6.653	6.491	6.348	6.221	6.101	5.988	5.876	5.765	5.674	5.58
35	6.819	6.641	6.487	6.359	6.225	6.114	6.006	5.906	5.813	5.722
40	6.891	6.731	6.603	6.465	6.339	6.22	6.117	6.013	5.919	5.822
45	7.019	6.857	6.701	6.566	6.435	6.315	6.207	6.105	6.018	5.933
50	7.035	6.876	6.725	6.589	6.468	6.343	6.236	6.136	6.043	5.953

Sample Size	Significance Level (1-α)									
	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	2.77	2.74	2.714	2.686	2.66	2.635	2.61	2.586	2.563	2.541
10	4.037	3.933	3.843	3.753	3.67	3.593	3.52	3.454	3.391	3.331
15	4.626	4.501	4.39	4.289	4.194	4.099	4.018	3.942	3.866	3.797
20	4.997	4.869	4.74	4.63	4.522	4.428	4.337	4.25	4.168	4.096
25	5.23	5.09	4.967	4.851	4.743	4.635	4.544	4.456	4.377	4.302
30	5.418	5.269	5.137	5.013	4.903	4.806	4.705	4.613	4.523	4.445
35	5.561	5.405	5.271	5.147	5.032	4.929	4.829	4.735	4.645	4.564
40	5.658	5.51	5.381	5.259	5.143	5.035	4.937	4.847	4.766	4.686
45	5.762	5.612	5.478	5.355	5.241	5.131	5.03	4.936	4.847	4.766
50	5.787	5.631	5.502	5.382	5.269	5.161	5.069	4.979	4.894	4.81

Table A.31 Kurtosis (b_2) Lower Tail Critical Values: $\beta = 4.0$

Sample	Significance Level (α)									
Size	0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05
5	1.191	1.207	1.219	1.229	1.239	1.247	1.253	1.26	1.266	1.272
10	1.322	1.376	1.411	1.44	1.464	1.484	1.503	1.52	1.536	1.551
15	1.465	1.522	1.563	1.595	1.619	1.641	1.66	1.679	1.695	1.712
20	1.568	1.625	1.664	1.697	1.726	1.751	1.772	1.793	1.811	1.828
25	1.658	1.722	1.762	1.795	1.823	1.847	1.868	1.889	1.908	1.925
30	1.72	1.783	1.827	1.861	1.888	1.914	1.937	1.958	1.978	1.997
35	1.783	1.847	1.891	1.925	1.954	1.98	2.002	2.022	2.041	2.059
40	1.832	1.895	1.944	1.979	2.01	2.038	2.062	2.086	2.106	2.125
45	1.881	1.95	1.997	2.037	2.066	2.093	2.118	2.14	2.161	2.182
50	1.932	1.996	2.042	2.079	2.11	2.139	2.162	2.185	2.204	2.226

Sample	Significance Level (α)									
Size	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1
5	1.279	1.286	1.291	1.298	1.305	1.312	1.319	1.325	1.332	1.339
10	1.565	1.579	1.591	1.604	1.616	1.628	1.639	1.649	1.66	1.669
15	1.728	1.742	1.756	1.769	1.782	1.794	1.805	1.817	1.828	1.839
20	1.844	1.86	1.876	1.89	1.903	1.916	1.929	1.943	1.954	1.966
25	1.941	1.956	1.971	1.986	2	2.014	2.027	2.04	2.054	2.066
30	2.015	2.031	2.047	2.063	2.078	2.093	2.105	2.119	2.132	2.145
35	2.077	2.093	2.11	2.125	2.14	2.154	2.168	2.182	2.196	2.209
40	2.142	2.159	2.174	2.189	2.204	2.219	2.234	2.248	2.262	2.276
45	2.201	2.218	2.234	2.251	2.267	2.282	2.297	2.312	2.326	2.34
50	2.246	2.264	2.281	2.299	2.315	2.33	2.346	2.361	2.374	2.388

Sample	Significance Level (α)									
Size	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
5	1.353	1.367	1.382	1.397	1.411	1.426	1.441	1.455	1.47	1.485
10	1.689	1.707	1.725	1.742	1.759	1.776	1.794	1.811	1.828	1.845
15	1.861	1.882	1.903	1.922	1.943	1.962	1.981	1.999	2.017	2.036
20	1.988	2.011	2.031	2.053	2.074	2.095	2.113	2.133	2.152	2.172
25	2.09	2.113	2.136	2.158	2.179	2.199	2.219	2.24	2.259	2.28
30	2.171	2.196	2.219	2.242	2.264	2.288	2.309	2.331	2.353	2.373
35	2.234	2.258	2.284	2.307	2.331	2.354	2.377	2.399	2.42	2.442
40	2.302	2.328	2.353	2.378	2.402	2.425	2.448	2.47	2.491	2.514
45	2.367	2.393	2.418	2.441	2.465	2.488	2.511	2.532	2.554	2.578
50	2.415	2.441	2.468	2.493	2.517	2.541	2.565	2.589	2.612	2.635

Table A.32 Kurtosis (b_2) Upper Tail Critical Values: $\beta = 4.0$

Sample Size	Significance Level (1-α)									
	0.995	0.99	0.985	0.98	0.975	0.97	0.965	0.96	0.955	0.95
5	3.194	3.156	3.125	3.098	3.072	3.049	3.026	3.005	2.985	2.966
10	6.478	6.077	5.804	5.599	5.447	5.281	5.146	5.026	4.918	4.808
15	8.485	7.684	7.189	6.847	6.582	6.326	6.12	5.933	5.769	5.613
20	9.734	8.678	8.026	7.568	7.194	6.917	6.659	6.451	6.249	6.077
25	10.506	9.259	8.528	8.013	7.589	7.274	6.991	6.751	6.549	6.364
30	10.789	9.55	8.812	8.246	7.837	7.479	7.198	6.955	6.741	6.553
35	11.19	9.787	8.996	8.411	7.972	7.619	7.336	7.073	6.859	6.659
40	11.598	9.983	9.176	8.569	8.131	7.779	7.476	7.225	7.031	6.829
45	11.547	10.018	9.182	8.565	8.156	7.795	7.492	7.25	7.038	6.859
50	11.683	10.131	9.27	8.7	8.247	7.878	7.58	7.325	7.091	6.902

Sample Size	Significance Level (1-α)									
	0.945	0.94	0.935	0.93	0.925	0.92	0.915	0.91	0.905	0.9
5	2.945	2.926	2.908	2.889	2.872	2.855	2.837	2.821	2.805	2.789
10	4.716	4.636	4.556	4.474	4.402	4.332	4.263	4.196	4.139	4.081
15	5.48	5.36	5.252	5.136	5.033	4.944	4.856	4.772	4.696	4.622
20	5.925	5.784	5.655	5.538	5.432	5.334	5.239	5.151	5.069	4.989
25	6.198	6.056	5.925	5.801	5.697	5.589	5.493	5.396	5.307	5.225
30	6.391	6.231	6.098	5.969	5.852	5.733	5.628	5.539	5.446	5.358
35	6.489	6.343	6.206	6.077	5.959	5.853	5.752	5.656	5.571	5.485
40	6.648	6.493	6.349	6.217	6.094	5.978	5.866	5.772	5.682	5.597
45	6.669	6.502	6.362	6.237	6.118	6.009	5.909	5.813	5.724	5.638
50	6.721	6.573	6.435	6.3	6.185	6.08	5.984	5.885	5.798	5.712

Sample Size	Significance Level (1-α)									
	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.8
5	2.759	2.73	2.701	2.674	2.647	2.623	2.597	2.574	2.552	2.531
10	3.974	3.876	3.783	3.699	3.619	3.548	3.478	3.414	3.353	3.297
15	4.495	4.38	4.272	4.167	4.076	3.992	3.911	3.835	3.765	3.697
20	4.844	4.72	4.601	4.491	4.386	4.29	4.199	4.122	4.049	3.977
25	5.079	4.937	4.814	4.7	4.596	4.5	4.403	4.316	4.232	4.161
30	5.204	5.078	4.954	4.842	4.737	4.644	4.553	4.467	4.389	4.31
35	5.331	5.188	5.055	4.943	4.838	4.741	4.65	4.569	4.489	4.413
40	5.44	5.302	5.172	5.057	4.947	4.85	4.756	4.672	4.593	4.512
45	5.479	5.342	5.224	5.112	5.004	4.903	4.809	4.721	4.644	4.566
50	5.566	5.425	5.302	5.186	5.078	4.98	4.888	4.803	4.721	4.645

Appendix B. Plots for Critical Values

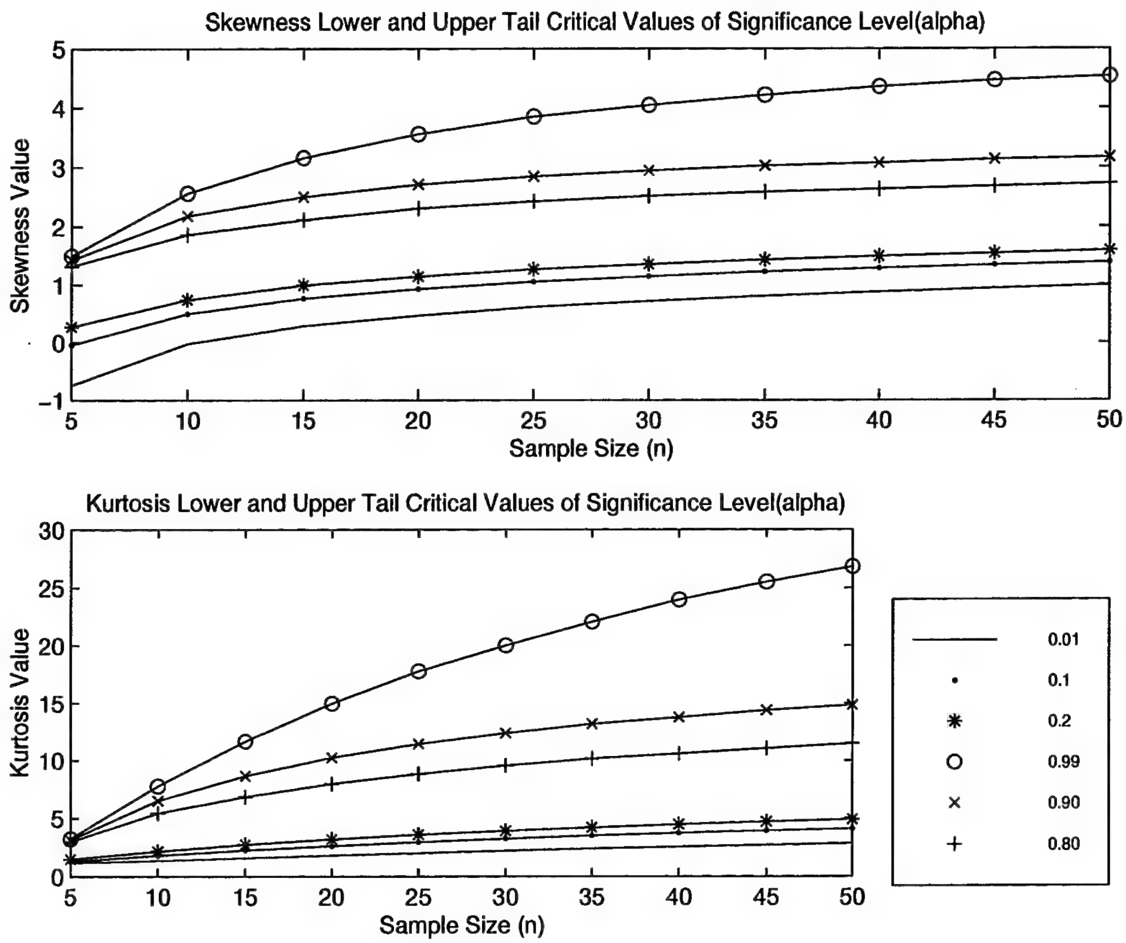


Figure B.1 Critical Values for Skewness and Kurtosis, β=0.5

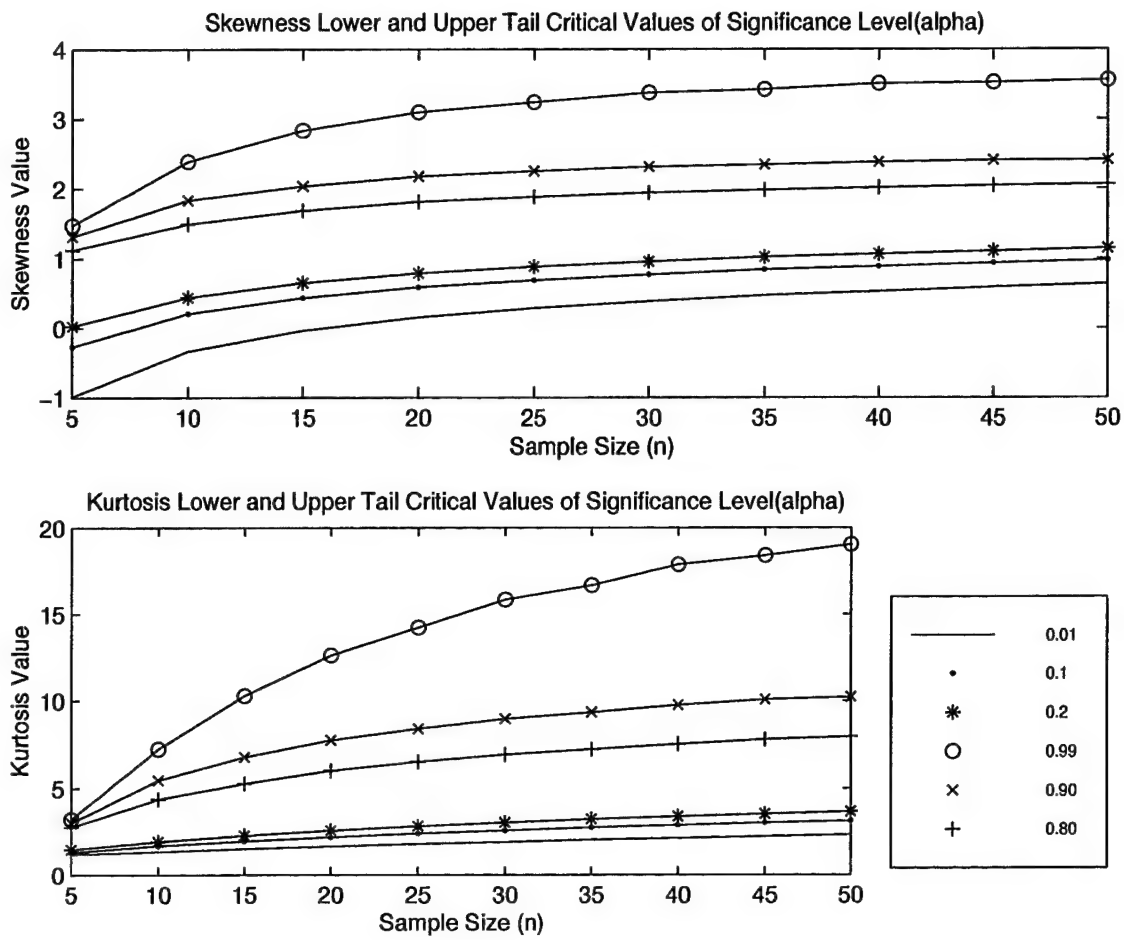


Figure B.2 Critical Values for Skewness and Kurtosis, β=1

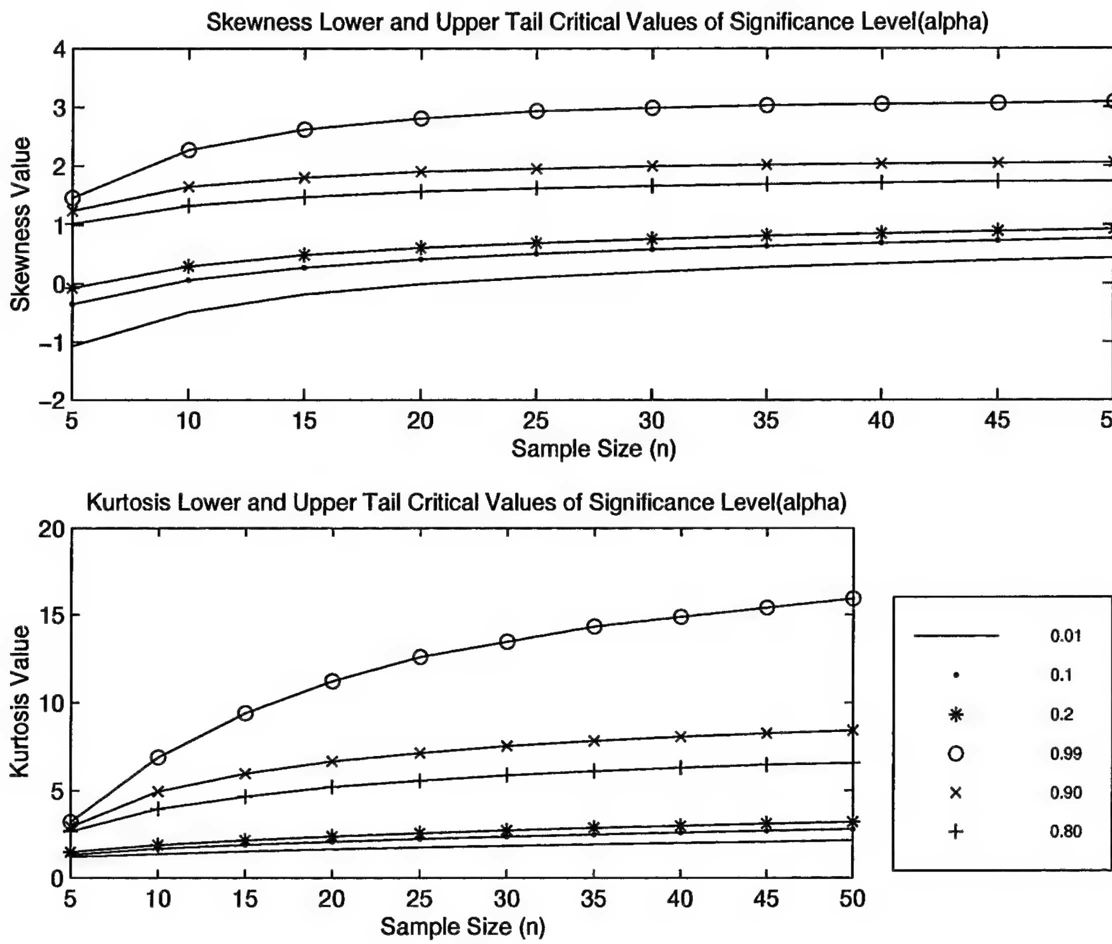


Figure B.3 Critical Values for Skewness and Kurtosis, β=1.5

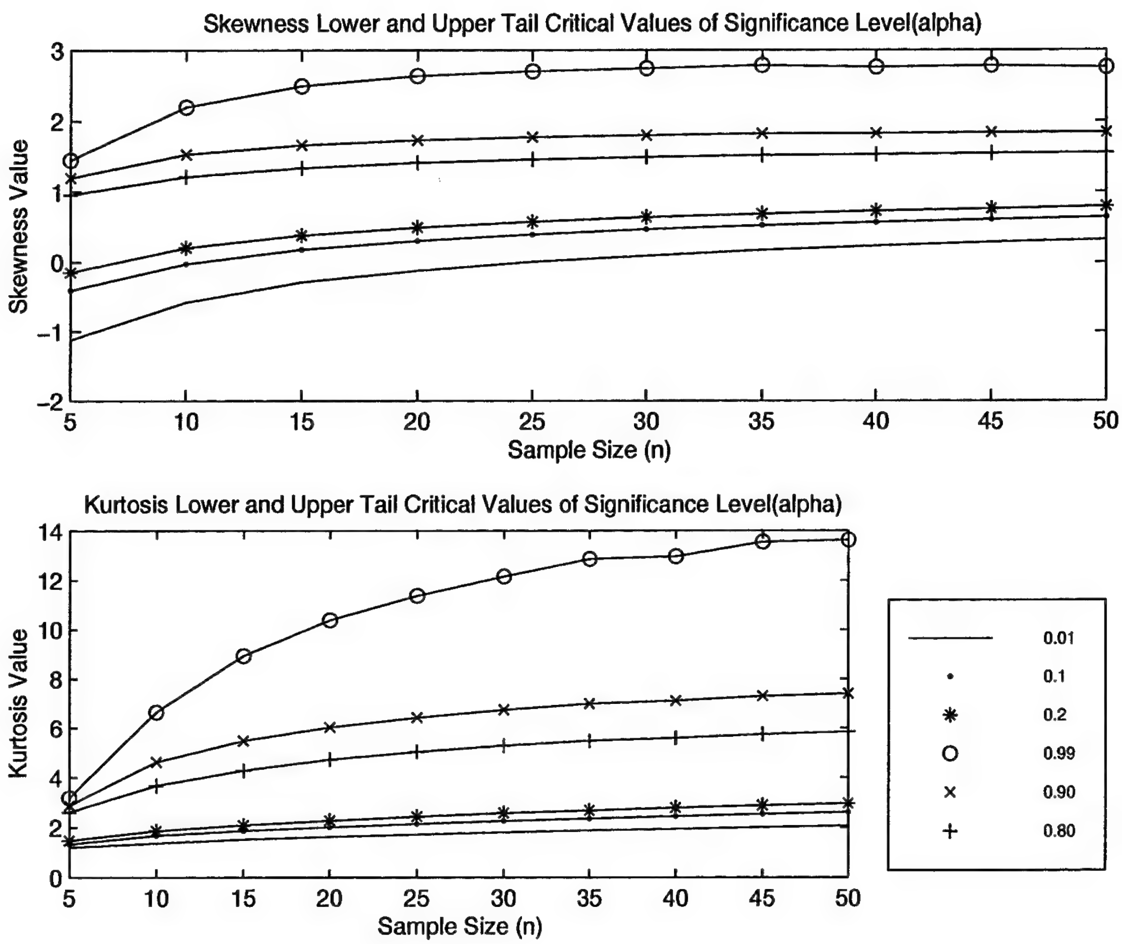


Figure B.4 Critical Values for Skewness and Kurtosis, β=2

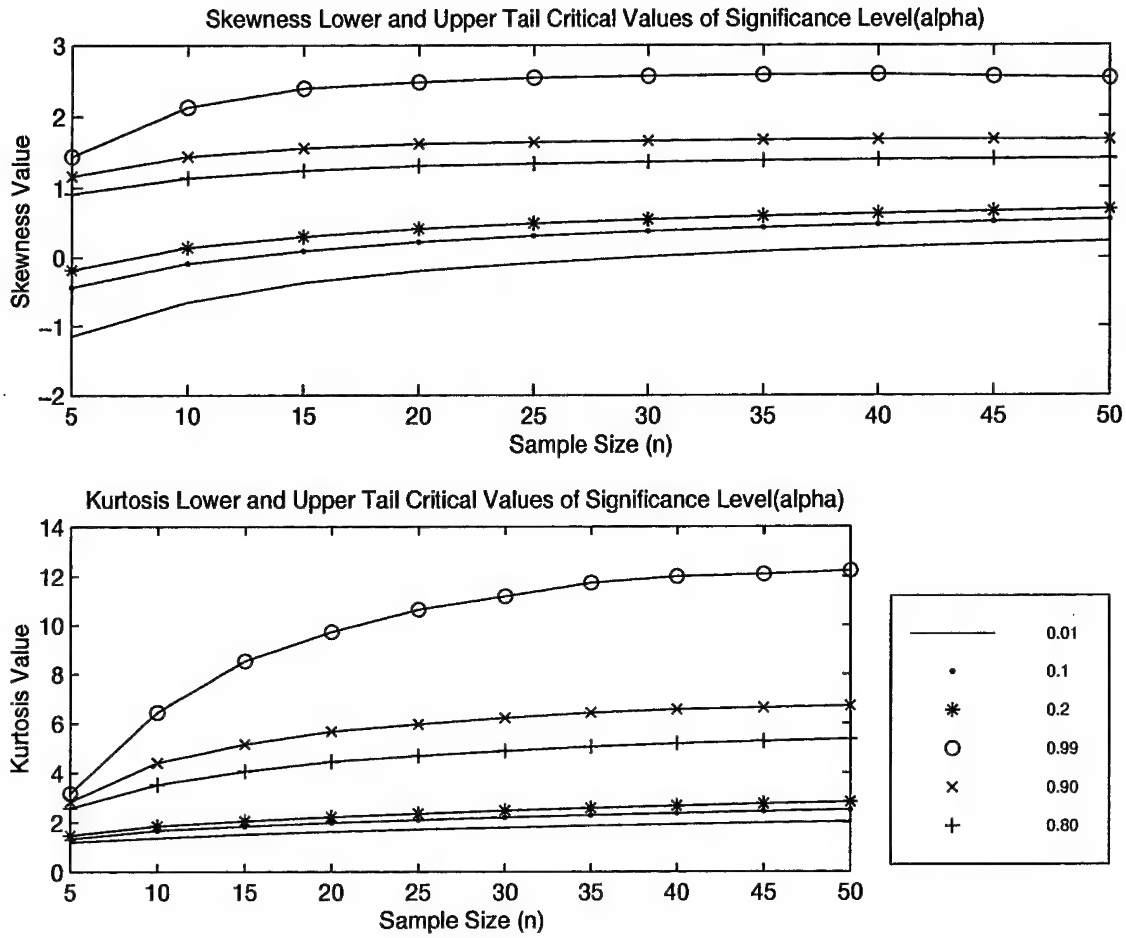


Figure B.5 Critical Values for Skewness and Kurtosis, β=2.5

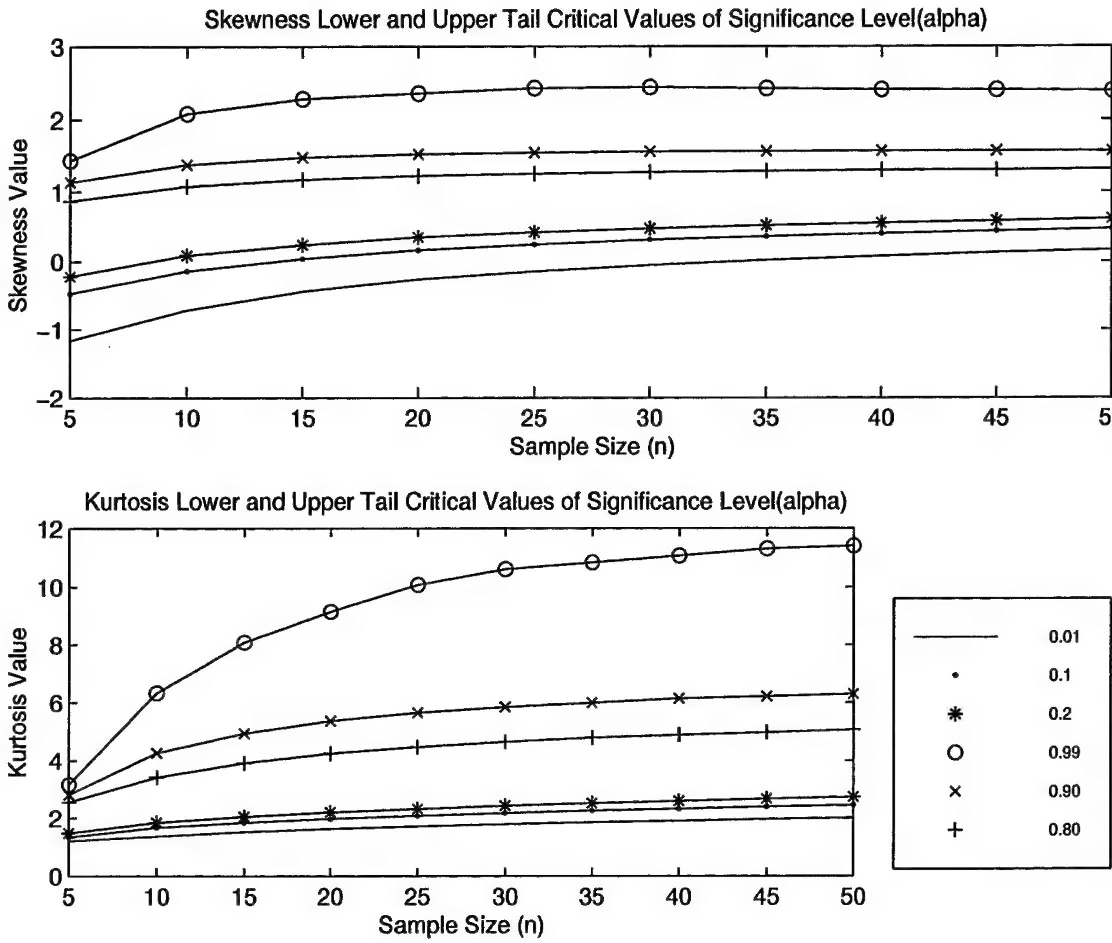


Figure B.6 Critical Values for Skewness and Kurtosis, β=3

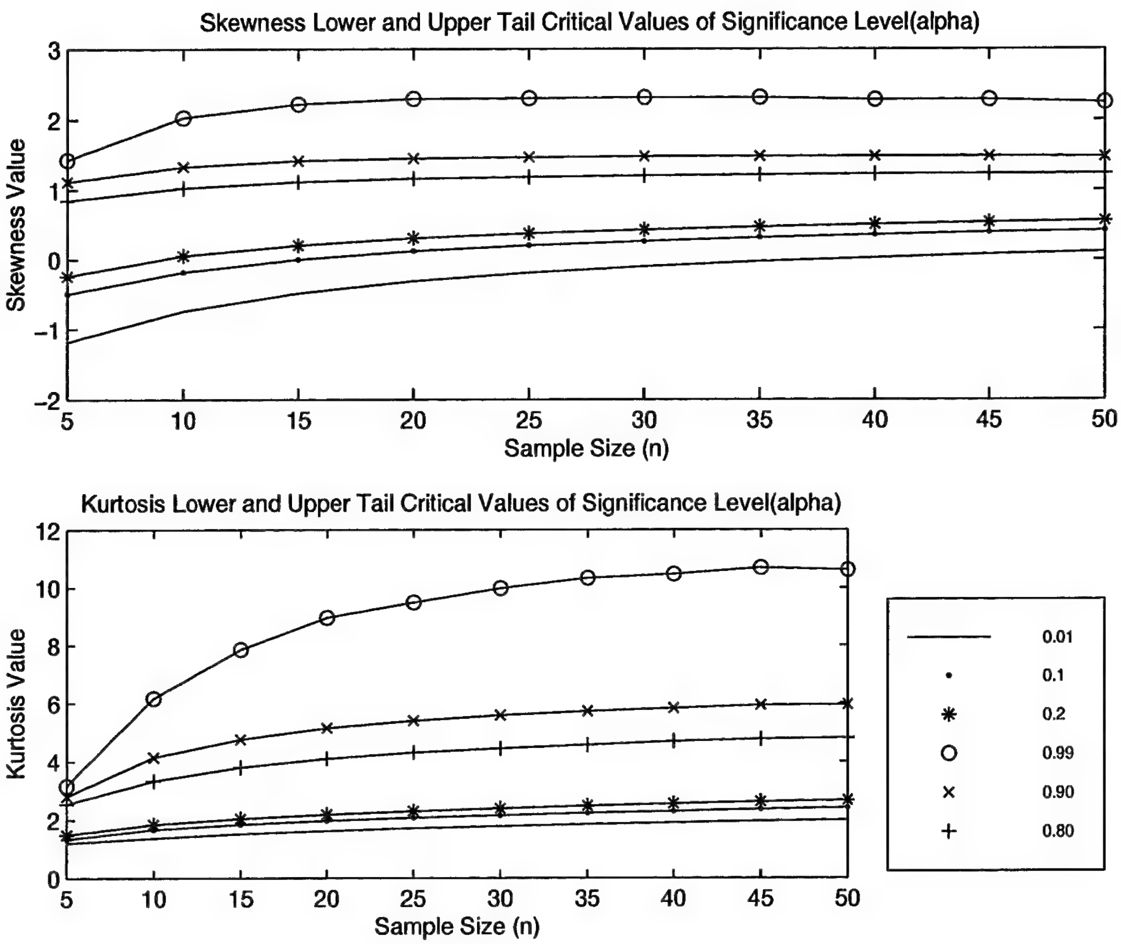


Figure B.7 Critical Values for Skewness and Kurtosis, β=3.5

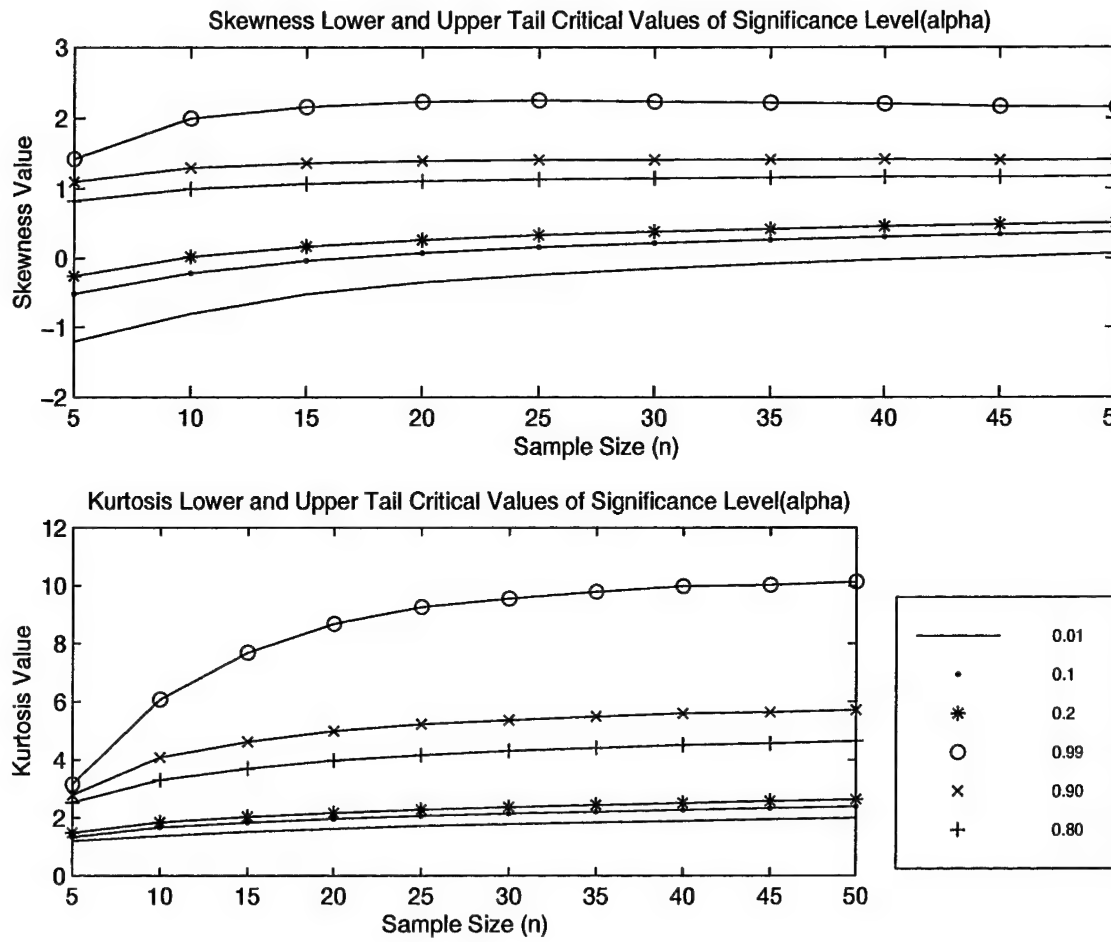


Figure B.8 Critical Values for Skewness and Kurtosis, β=4

C.1 Gamma Shape $(\beta) = 1$

Table C.1 Attained Significance Levels: Sample size = 5 ; $\beta = 1$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.015	0.025	0.035	0.045	0.055	0.065	0.075	0.085	0.094	0.104	0.114	0.124	0.134	0.144	0.154	0.164	0.174	0.183	0.193	0.203
0.02	0.025	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.099	0.109	0.119	0.129	0.139	0.149	0.159	0.169	0.179	0.188	0.198	0.208
0.03	0.035	0.04	0.045	0.055	0.065	0.075	0.085	0.095	0.104	0.114	0.124	0.134	0.144	0.154	0.164	0.174	0.184	0.193	0.203	0.213
0.04	0.045	0.05	0.055	0.06	0.07	0.08	0.09	0.1	0.109	0.119	0.129	0.139	0.149	0.159	0.169	0.179	0.189	0.198	0.208	0.218
0.05	0.055	0.06	0.065	0.07	0.075	0.085	0.095	0.105	0.114	0.124	0.134	0.144	0.154	0.164	0.174	0.184	0.194	0.203	0.213	0.223
0.06	0.065	0.07	0.075	0.08	0.085	0.091	0.1	0.11	0.119	0.129	0.139	0.149	0.159	0.169	0.179	0.189	0.199	0.208	0.218	0.228
0.07	0.075	0.08	0.085	0.09	0.095	0.1	0.106	0.115	0.124	0.134	0.144	0.154	0.164	0.174	0.184	0.194	0.204	0.213	0.223	0.233
0.08	0.085	0.09	0.095	0.1	0.105	0.11	0.115	0.121	0.129	0.139	0.149	0.159	0.169	0.179	0.189	0.199	0.209	0.218	0.228	0.238
0.09	0.095	0.1	0.105	0.11	0.115	0.12	0.125	0.13	0.136	0.144	0.154	0.164	0.174	0.184	0.194	0.204	0.214	0.223	0.233	0.243
0.1	0.105	0.11	0.115	0.12	0.125	0.13	0.135	0.14	0.145	0.151	0.159	0.169	0.179	0.189	0.199	0.209	0.219	0.228	0.238	0.248
0.11	0.115	0.12	0.125	0.13	0.135	0.14	0.145	0.15	0.155	0.16	0.166	0.174	0.184	0.194	0.204	0.213	0.223	0.233	0.243	0.253
0.12	0.125	0.13	0.135	0.14	0.145	0.15	0.154	0.159	0.164	0.169	0.174	0.181	0.189	0.198	0.208	0.217	0.227	0.237	0.247	0.256
0.13	0.134	0.139	0.144	0.149	0.153	0.158	0.163	0.168	0.173	0.178	0.182	0.188	0.194	0.202	0.211	0.22	0.23	0.24	0.25	0.260
0.14	0.144	0.148	0.153	0.157	0.162	0.167	0.172	0.176	0.181	0.186	0.191	0.196	0.201	0.207	0.215	0.224	0.233	0.243	0.253	0.263
0.15	0.154	0.158	0.162	0.166	0.171	0.176	0.18	0.185	0.19	0.195	0.2	0.204	0.209	0.215	0.221	0.228	0.237	0.247	0.256	0.266
0.16	0.164	0.168	0.172	0.176	0.18	0.185	0.189	0.194	0.199	0.203	0.208	0.213	0.218	0.223	0.228	0.234	0.242	0.25	0.259	0.269
0.17	0.174	0.178	0.181	0.185	0.189	0.194	0.198	0.203	0.207	0.212	0.217	0.221	0.226	0.231	0.236	0.241	0.247	0.255	0.263	0.272
0.18	0.184	0.188	0.191	0.195	0.199	0.203	0.207	0.212	0.216	0.221	0.226	0.23	0.235	0.239	0.244	0.249	0.255	0.261	0.268	0.276
0.19	0.194	0.198	0.201	0.205	0.209	0.213	0.217	0.221	0.225	0.23	0.234	0.239	0.243	0.248	0.252	0.257	0.262	0.268	0.274	0.281
0.2	0.204	0.208	0.211	0.215	0.218	0.222	0.226	0.23	0.235	0.239	0.243	0.248	0.252	0.257	0.261	0.265	0.27	0.275	0.281	0.287

Table C.2 Attained Significance Levels: Sample size = 10 ; $\beta = 1$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.015	0.025	0.035	0.045	0.055	0.065	0.075	0.085	0.095	0.105	0.115	0.125	0.135	0.145	0.155	0.165	0.175	0.185	0.195	0.205
0.02	0.025	0.03	0.04	0.05	0.06	0.07	0.08	0.089	0.099	0.109	0.119	0.129	0.139	0.149	0.159	0.169	0.178	0.188	0.198	0.208
0.03	0.035	0.04	0.045	0.054	0.064	0.074	0.084	0.094	0.104	0.113	0.123	0.133	0.143	0.153	0.162	0.172	0.182	0.192	0.201	0.211
0.04	0.045	0.049	0.054	0.06	0.069	0.078	0.088	0.098	0.107	0.117	0.127	0.137	0.146	0.156	0.166	0.175	0.185	0.194	0.204	0.214
0.05	0.055	0.059	0.064	0.068	0.074	0.083	0.092	0.101	0.111	0.121	0.13	0.14	0.149	0.159	0.169	0.178	0.187	0.197	0.207	0.216
0.06	0.064	0.069	0.073	0.078	0.082	0.088	0.096	0.105	0.115	0.124	0.133	0.143	0.152	0.162	0.171	0.181	0.19	0.2	0.209	0.219
0.07	0.074	0.078	0.083	0.087	0.091	0.095	0.101	0.109	0.118	0.127	0.137	0.146	0.155	0.165	0.174	0.183	0.193	0.202	0.212	0.221
0.08	0.084	0.088	0.092	0.096	0.1	0.104	0.108	0.114	0.122	0.131	0.14	0.149	0.158	0.168	0.177	0.186	0.195	0.205	0.214	0.223
0.09	0.094	0.098	0.101	0.105	0.109	0.113	0.117	0.121	0.127	0.135	0.143	0.152	0.161	0.171	0.18	0.189	0.198	0.207	0.216	0.226
0.1	0.103	0.107	0.111	0.114	0.118	0.122	0.126	0.13	0.134	0.14	0.147	0.156	0.165	0.174	0.183	0.192	0.201	0.21	0.219	0.228
0.11	0.113	0.117	0.12	0.124	0.127	0.131	0.134	0.138	0.142	0.146	0.152	0.159	0.168	0.176	0.185	0.194	0.203	0.212	0.221	0.230
0.12	0.123	0.126	0.129	0.133	0.136	0.14	0.143	0.147	0.15	0.154	0.159	0.165	0.172	0.18	0.188	0.197	0.206	0.214	0.223	0.232
0.13	0.133	0.136	0.139	0.142	0.145	0.148	0.151	0.155	0.159	0.162	0.166	0.171	0.176	0.183	0.191	0.2	0.208	0.217	0.226	0.235
0.14	0.142	0.145	0.148	0.151	0.154	0.157	0.16	0.163	0.167	0.17	0.174	0.178	0.182	0.188	0.195	0.203	0.211	0.22	0.228	0.237
0.15	0.152	0.155	0.157	0.16	0.163	0.166	0.169	0.172	0.176	0.179	0.182	0.186	0.19	0.195	0.2	0.207	0.215	0.223	0.231	0.240
0.16	0.162	0.164	0.167	0.169	0.172	0.175	0.178	0.181	0.184	0.187	0.19	0.194	0.197	0.201	0.206	0.212	0.219	0.226	0.234	0.242
0.17	0.172	0.174	0.176	0.179	0.181	0.184	0.187	0.19	0.193	0.196	0.199	0.202	0.205	0.209	0.213	0.218	0.223	0.23	0.237	0.245
0.18	0.182	0.184	0.186	0.188	0.191	0.193	0.196	0.198	0.201	0.204	0.207	0.21	0.213	0.217	0.22	0.224	0.229	0.235	0.241	0.248
0.19	0.191	0.193	0.195	0.198	0.2	0.202	0.205	0.207	0.21	0.213	0.216	0.219	0.222	0.225	0.228	0.232	0.236	0.241	0.246	0.253
0.2	0.201	0.203	0.205	0.207	0.209	0.211	0.214	0.216	0.219	0.222	0.224	0.227	0.23	0.233	0.236	0.239	0.243	0.247	0.252	0.258

Table C.3 Attained Significance Levels: Sample size = 15 ; $\beta = 1$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.015	0.024	0.034	0.044	0.054	0.064	0.074	0.083	0.093	0.103	0.113	0.123	0.133	0.143	0.152	0.162	0.172	0.182	0.192	0.202
0.02	0.024	0.029	0.038	0.047	0.057	0.067	0.076	0.086	0.095	0.105	0.115	0.125	0.134	0.144	0.154	0.164	0.174	0.183	0.193	0.203
0.03	0.034	0.038	0.042	0.051	0.06	0.07	0.079	0.089	0.098	0.107	0.117	0.127	0.136	0.146	0.156	0.165	0.175	0.185	0.195	0.204
0.04	0.043	0.047	0.051	0.055	0.063	0.073	0.082	0.091	0.1	0.11	0.119	0.129	0.138	0.148	0.157	0.167	0.177	0.186	0.196	0.206
0.05	0.053	0.056	0.059	0.063	0.068	0.076	0.085	0.094	0.103	0.112	0.121	0.131	0.14	0.15	0.159	0.169	0.178	0.188	0.197	0.207
0.06	0.062	0.065	0.068	0.072	0.075	0.081	0.088	0.097	0.105	0.114	0.124	0.133	0.142	0.152	0.161	0.17	0.18	0.189	0.199	0.208
0.07	0.072	0.074	0.077	0.08	0.084	0.087	0.093	0.1	0.108	0.117	0.126	0.135	0.144	0.153	0.163	0.172	0.181	0.191	0.2	0.209
0.08	0.082	0.084	0.086	0.089	0.092	0.096	0.099	0.104	0.112	0.12	0.128	0.137	0.146	0.155	0.164	0.174	0.183	0.192	0.201	0.211
0.09	0.091	0.093	0.095	0.098	0.101	0.104	0.107	0.111	0.116	0.123	0.131	0.14	0.149	0.158	0.166	0.176	0.185	0.194	0.203	0.212
0.1	0.101	0.102	0.104	0.107	0.11	0.112	0.115	0.119	0.122	0.128	0.135	0.143	0.151	0.16	0.169	0.178	0.187	0.196	0.205	0.214
0.11	0.111	0.112	0.114	0.116	0.118	0.121	0.124	0.127	0.13	0.134	0.14	0.147	0.154	0.163	0.171	0.18	0.189	0.198	0.206	0.215
0.12	0.121	0.122	0.123	0.125	0.127	0.13	0.132	0.135	0.138	0.141	0.146	0.151	0.158	0.165	0.173	0.182	0.191	0.2	0.208	0.217
0.13	0.131	0.132	0.133	0.134	0.137	0.139	0.141	0.144	0.146	0.149	0.153	0.157	0.163	0.169	0.177	0.185	0.193	0.202	0.21	0.219
0.14	0.14	0.141	0.142	0.144	0.146	0.148	0.15	0.152	0.155	0.158	0.161	0.164	0.169	0.174	0.181	0.188	0.196	0.204	0.213	0.221
0.15	0.15	0.151	0.152	0.153	0.155	0.157	0.159	0.161	0.163	0.166	0.169	0.172	0.175	0.18	0.186	0.192	0.199	0.207	0.215	0.223
0.16	0.16	0.161	0.162	0.163	0.164	0.166	0.168	0.17	0.172	0.174	0.177	0.18	0.183	0.187	0.191	0.197	0.203	0.21	0.218	0.226
0.17	0.17	0.171	0.171	0.172	0.174	0.175	0.177	0.179	0.181	0.183	0.186	0.188	0.191	0.194	0.198	0.203	0.208	0.215	0.222	0.229
0.18	0.18	0.181	0.181	0.182	0.183	0.185	0.186	0.188	0.19	0.192	0.194	0.196	0.199	0.202	0.205	0.209	0.214	0.219	0.226	0.232
0.19	0.19	0.19	0.191	0.192	0.193	0.194	0.195	0.197	0.198	0.2	0.203	0.205	0.207	0.21	0.213	0.216	0.22	0.225	0.23	0.236
0.2	0.2	0.2	0.201	0.202	0.203	0.204	0.205	0.206	0.208	0.209	0.211	0.213	0.216	0.218	0.221	0.224	0.227	0.231	0.236	0.241

Table C.4 Attained Significance Levels: Sample size = 20 ; $\beta = 1$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.014	0.024	0.033	0.043	0.052	0.062	0.072	0.082	0.091	0.101	0.111	0.121	0.131	0.141	0.151	0.161	0.171	0.181	0.191	0.200
0.02	0.023	0.027	0.036	0.045	0.055	0.064	0.074	0.083	0.093	0.103	0.112	0.122	0.132	0.142	0.152	0.162	0.171	0.181	0.191	0.201
0.03	0.033	0.036	0.04	0.048	0.057	0.066	0.076	0.085	0.095	0.104	0.114	0.123	0.133	0.143	0.153	0.162	0.172	0.182	0.192	0.202
0.04	0.042	0.045	0.048	0.052	0.06	0.069	0.078	0.087	0.097	0.106	0.115	0.125	0.134	0.144	0.154	0.163	0.173	0.183	0.192	0.202
0.05	0.052	0.054	0.056	0.06	0.064	0.072	0.081	0.09	0.099	0.108	0.117	0.126	0.136	0.145	0.155	0.164	0.174	0.184	0.193	0.203
0.06	0.061	0.063	0.065	0.068	0.072	0.077	0.084	0.092	0.101	0.11	0.119	0.128	0.137	0.147	0.156	0.166	0.175	0.185	0.194	0.204
0.07	0.071	0.073	0.074	0.077	0.08	0.083	0.089	0.096	0.104	0.112	0.121	0.13	0.139	0.148	0.158	0.167	0.176	0.186	0.195	0.205
0.08	0.081	0.082	0.084	0.086	0.088	0.091	0.095	0.1	0.107	0.115	0.123	0.132	0.141	0.15	0.159	0.168	0.178	0.187	0.196	0.206
0.09	0.09	0.091	0.093	0.095	0.097	0.1	0.103	0.106	0.112	0.118	0.126	0.134	0.143	0.152	0.161	0.17	0.179	0.188	0.197	0.207
0.1	0.1	0.101	0.102	0.104	0.106	0.108	0.111	0.114	0.118	0.123	0.13	0.138	0.146	0.154	0.163	0.172	0.181	0.19	0.199	0.208
0.11	0.11	0.111	0.112	0.113	0.115	0.117	0.12	0.122	0.125	0.129	0.135	0.141	0.149	0.157	0.165	0.174	0.183	0.192	0.2	0.209
0.12	0.12	0.121	0.121	0.123	0.124	0.126	0.128	0.13	0.133	0.136	0.141	0.146	0.153	0.16	0.168	0.176	0.185	0.193	0.202	0.211
0.13	0.13	0.13	0.131	0.132	0.134	0.135	0.137	0.139	0.141	0.144	0.147	0.152	0.157	0.164	0.171	0.179	0.187	0.196	0.204	0.213
0.14	0.14	0.14	0.141	0.142	0.143	0.144	0.146	0.148	0.15	0.152	0.155	0.158	0.163	0.169	0.175	0.182	0.19	0.198	0.206	0.215
0.15	0.15	0.15	0.151	0.151	0.152	0.153	0.155	0.157	0.159	0.161	0.163	0.166	0.169	0.174	0.18	0.186	0.193	0.201	0.209	0.217
0.16	0.16	0.16	0.161	0.161	0.162	0.163	0.164	0.166	0.167	0.169	0.171	0.174	0.177	0.181	0.185	0.191	0.197	0.204	0.212	0.220
0.17	0.17	0.17	0.17	0.171	0.172	0.173	0.174	0.175	0.176	0.178	0.18	0.182	0.185	0.188	0.192	0.196	0.202	0.208	0.215	0.223
0.18	0.18	0.18	0.18	0.181	0.181	0.182	0.183	0.184	0.186	0.187	0.189	0.191	0.193	0.196	0.199	0.203	0.208	0.214	0.22	0.227
0.19	0.19	0.19	0.19	0.191	0.191	0.192	0.193	0.194	0.195	0.196	0.198	0.199	0.201	0.204	0.206	0.21	0.214	0.219	0.225	0.231
0.2	0.2	0.2	0.2	0.2	0.201	0.201	0.202	0.203	0.204	0.205	0.207	0.208	0.21	0.212	0.214	0.217	0.221	0.225	0.23	0.236

Table C.5 Attained Significance Levels: Sample size = 25 ; $\beta = 1$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.014	0.023	0.032	0.042	0.052	0.061	0.071	0.081	0.091	0.101	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.02	0.022	0.027	0.035	0.044	0.053	0.063	0.072	0.082	0.091	0.101	0.111	0.121	0.131	0.141	0.151	0.161	0.171	0.181	0.19	0.200
0.03	0.032	0.034	0.039	0.047	0.056	0.065	0.074	0.083	0.093	0.102	0.112	0.122	0.132	0.141	0.151	0.161	0.171	0.181	0.191	0.201
0.04	0.041	0.043	0.046	0.051	0.059	0.067	0.076	0.085	0.094	0.104	0.113	0.123	0.133	0.142	0.152	0.162	0.172	0.182	0.191	0.201
0.05	0.051	0.052	0.055	0.058	0.063	0.07	0.078	0.087	0.096	0.105	0.115	0.124	0.134	0.143	0.153	0.163	0.172	0.182	0.192	0.202
0.06	0.06	0.062	0.064	0.066	0.069	0.074	0.081	0.089	0.098	0.107	0.116	0.126	0.135	0.144	0.154	0.164	0.173	0.183	0.192	0.202
0.07	0.07	0.071	0.073	0.075	0.077	0.081	0.085	0.092	0.101	0.109	0.118	0.127	0.136	0.146	0.155	0.165	0.174	0.184	0.193	0.203
0.08	0.08	0.081	0.082	0.084	0.086	0.089	0.092	0.097	0.104	0.112	0.12	0.129	0.138	0.147	0.156	0.166	0.175	0.185	0.194	0.204
0.09	0.09	0.091	0.092	0.093	0.095	0.097	0.1	0.103	0.109	0.116	0.123	0.132	0.14	0.149	0.158	0.167	0.177	0.186	0.195	0.205
0.1	0.1	0.101	0.101	0.102	0.104	0.106	0.108	0.111	0.115	0.12	0.127	0.135	0.143	0.151	0.16	0.169	0.178	0.187	0.197	0.206
0.11	0.11	0.11	0.111	0.112	0.113	0.115	0.117	0.119	0.122	0.127	0.132	0.139	0.146	0.154	0.162	0.171	0.18	0.189	0.198	0.207
0.12	0.12	0.12	0.121	0.121	0.123	0.124	0.126	0.128	0.13	0.133	0.138	0.143	0.15	0.157	0.165	0.174	0.182	0.191	0.199	0.208
0.13	0.13	0.13	0.131	0.131	0.132	0.133	0.135	0.136	0.139	0.141	0.145	0.149	0.155	0.161	0.169	0.177	0.185	0.193	0.201	0.210
0.14	0.14	0.14	0.14	0.141	0.142	0.143	0.144	0.146	0.147	0.15	0.152	0.156	0.161	0.166	0.173	0.18	0.188	0.196	0.204	0.212
0.15	0.15	0.15	0.15	0.151	0.151	0.152	0.153	0.155	0.156	0.158	0.16	0.163	0.167	0.172	0.178	0.184	0.191	0.199	0.207	0.215
0.16	0.16	0.16	0.16	0.161	0.161	0.162	0.163	0.164	0.165	0.167	0.169	0.171	0.175	0.178	0.183	0.189	0.196	0.203	0.21	0.218
0.17	0.17	0.17	0.17	0.17	0.171	0.171	0.172	0.173	0.174	0.176	0.178	0.18	0.182	0.186	0.19	0.195	0.201	0.207	0.214	0.221
0.18	0.18	0.18	0.18	0.18	0.181	0.181	0.182	0.183	0.184	0.185	0.186	0.188	0.191	0.193	0.197	0.201	0.206	0.212	0.218	0.225
0.19	0.19	0.19	0.19	0.19	0.19	0.191	0.191	0.192	0.193	0.194	0.196	0.197	0.199	0.201	0.204	0.208	0.213	0.218	0.223	0.230
0.2	0.2	0.2	0.2	0.2	0.2	0.201	0.201	0.202	0.202	0.204	0.205	0.206	0.208	0.21	0.212	0.216	0.219	0.224	0.229	0.235

Table C.6 Attained Significance Levels: Sample size = 30 ; $\beta = 1$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.013	0.022	0.031	0.041	0.051	0.061	0.071	0.08	0.09	0.1	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.02	0.022	0.025	0.034	0.043	0.052	0.062	0.071	0.081	0.091	0.101	0.111	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.03	0.031	0.033	0.037	0.045	0.054	0.063	0.073	0.082	0.092	0.101	0.111	0.121	0.131	0.141	0.151	0.161	0.17	0.18	0.19	0.200
0.04	0.041	0.042	0.045	0.049	0.056	0.065	0.074	0.084	0.093	0.102	0.112	0.122	0.131	0.141	0.151	0.161	0.171	0.181	0.191	0.201
0.05	0.05	0.052	0.053	0.056	0.061	0.068	0.077	0.085	0.095	0.104	0.113	0.123	0.132	0.142	0.152	0.162	0.171	0.181	0.191	0.201
0.06	0.06	0.061	0.063	0.065	0.068	0.073	0.08	0.088	0.097	0.106	0.115	0.124	0.133	0.143	0.153	0.162	0.172	0.182	0.192	0.201
0.07	0.07	0.071	0.072	0.074	0.076	0.079	0.085	0.091	0.099	0.108	0.117	0.126	0.135	0.144	0.154	0.163	0.173	0.183	0.192	0.202
0.08	0.08	0.08	0.081	0.083	0.085	0.087	0.091	0.096	0.103	0.111	0.119	0.128	0.137	0.146	0.155	0.164	0.174	0.183	0.193	0.203
0.09	0.09	0.09	0.091	0.092	0.094	0.096	0.099	0.102	0.108	0.115	0.122	0.13	0.139	0.148	0.157	0.166	0.175	0.184	0.194	0.203
0.1	0.1	0.1	0.101	0.102	0.103	0.105	0.107	0.11	0.114	0.119	0.126	0.134	0.141	0.15	0.159	0.167	0.176	0.185	0.195	0.204
0.11	0.11	0.11	0.11	0.111	0.112	0.114	0.116	0.118	0.121	0.125	0.131	0.137	0.145	0.153	0.161	0.169	0.178	0.187	0.196	0.205
0.12	0.12	0.12	0.12	0.121	0.122	0.123	0.125	0.126	0.129	0.132	0.137	0.142	0.149	0.156	0.164	0.172	0.18	0.189	0.198	0.207
0.13	0.13	0.13	0.13	0.131	0.131	0.132	0.134	0.135	0.137	0.14	0.144	0.148	0.154	0.16	0.167	0.175	0.183	0.191	0.199	0.208
0.14	0.14	0.14	0.14	0.14	0.141	0.142	0.143	0.144	0.146	0.148	0.151	0.155	0.16	0.166	0.172	0.179	0.186	0.194	0.202	0.210
0.15	0.15	0.15	0.15	0.15	0.151	0.151	0.152	0.154	0.155	0.157	0.159	0.162	0.166	0.171	0.177	0.183	0.19	0.197	0.205	0.212
0.16	0.16	0.16	0.16	0.16	0.16	0.161	0.162	0.163	0.164	0.166	0.168	0.17	0.173	0.178	0.182	0.188	0.194	0.201	0.208	0.215
0.17	0.17	0.17	0.17	0.17	0.17	0.171	0.171	0.172	0.173	0.175	0.176	0.178	0.181	0.184	0.188	0.193	0.199	0.205	0.212	0.219
0.18	0.18	0.18	0.18	0.18	0.18	0.181	0.181	0.182	0.183	0.184	0.185	0.187	0.189	0.192	0.195	0.199	0.204	0.21	0.216	0.222
0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.191	0.191	0.192	0.193	0.194	0.196	0.197	0.2	0.203	0.206	0.21	0.215	0.221	0.227
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.201	0.201	0.202	0.203	0.204	0.205	0.206	0.208	0.211	0.214	0.217	0.222	0.227	0.232

Table C.7 Attained Significance Levels: Sample size = 35 ; $\beta = 1$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.013	0.022	0.031	0.041	0.051	0.06	0.07	0.08	0.09	0.1	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.02	0.022	0.025	0.033	0.042	0.052	0.061	0.071	0.081	0.091	0.101	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.03	0.031	0.033	0.037	0.045	0.054	0.063	0.072	0.082	0.092	0.101	0.111	0.121	0.131	0.141	0.15	0.16	0.17	0.18	0.19	0.200
0.04	0.041	0.042	0.045	0.049	0.057	0.065	0.074	0.083	0.093	0.102	0.112	0.121	0.131	0.141	0.151	0.161	0.171	0.181	0.19	0.200
0.05	0.05	0.051	0.053	0.056	0.061	0.068	0.076	0.085	0.094	0.103	0.113	0.122	0.132	0.142	0.151	0.161	0.171	0.181	0.191	0.201
0.06	0.06	0.061	0.062	0.064	0.067	0.072	0.079	0.087	0.096	0.105	0.114	0.123	0.133	0.142	0.152	0.162	0.172	0.181	0.191	0.201
0.07	0.07	0.07	0.071	0.073	0.075	0.079	0.084	0.091	0.099	0.107	0.116	0.125	0.134	0.143	0.153	0.163	0.172	0.182	0.192	0.201
0.08	0.08	0.08	0.081	0.082	0.084	0.087	0.09	0.096	0.103	0.11	0.118	0.127	0.136	0.145	0.154	0.164	0.173	0.183	0.192	0.202
0.09	0.09	0.09	0.091	0.092	0.093	0.095	0.098	0.102	0.107	0.114	0.122	0.129	0.138	0.147	0.156	0.165	0.174	0.184	0.193	0.203
0.1	0.1	0.1	0.101	0.101	0.102	0.104	0.106	0.109	0.113	0.119	0.125	0.132	0.14	0.149	0.157	0.166	0.175	0.185	0.194	0.203
0.11	0.11	0.11	0.11	0.111	0.112	0.113	0.115	0.117	0.12	0.124	0.13	0.136	0.144	0.151	0.159	0.168	0.177	0.186	0.195	0.205
0.12	0.12	0.12	0.12	0.121	0.121	0.122	0.124	0.126	0.128	0.131	0.136	0.141	0.148	0.155	0.162	0.171	0.179	0.188	0.197	0.206
0.13	0.13	0.13	0.13	0.13	0.131	0.132	0.133	0.134	0.136	0.139	0.143	0.147	0.153	0.159	0.166	0.174	0.182	0.19	0.198	0.207
0.14	0.14	0.14	0.14	0.14	0.141	0.141	0.142	0.144	0.145	0.147	0.15	0.154	0.158	0.164	0.17	0.177	0.185	0.192	0.201	0.209
0.15	0.15	0.15	0.15	0.15	0.15	0.151	0.152	0.153	0.154	0.156	0.158	0.161	0.165	0.17	0.175	0.181	0.188	0.195	0.203	0.211
0.16	0.16	0.16	0.16	0.16	0.16	0.161	0.161	0.162	0.163	0.165	0.167	0.169	0.172	0.176	0.181	0.186	0.193	0.199	0.207	0.214
0.17	0.17	0.17	0.17	0.17	0.17	0.171	0.171	0.172	0.173	0.174	0.176	0.177	0.18	0.183	0.187	0.192	0.198	0.204	0.211	0.218
0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.181	0.181	0.182	0.183	0.185	0.186	0.188	0.191	0.194	0.199	0.204	0.209	0.215	0.222
0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.191	0.191	0.192	0.193	0.194	0.195	0.197	0.199	0.202	0.206	0.21	0.214	0.22	0.226
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.201	0.201	0.202	0.203	0.204	0.206	0.207	0.21	0.213	0.217	0.221	0.226	0.231

Table C.8 Attained Significance Levels: Sample size = 40 ; $\beta = 1$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.013	0.021	0.031	0.041	0.05	0.06	0.07	0.08	0.09	0.1	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.02	0.021	0.025	0.033	0.042	0.052	0.061	0.071	0.081	0.091	0.1	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.03	0.031	0.033	0.037	0.045	0.053	0.063	0.072	0.082	0.091	0.101	0.111	0.121	0.131	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.04	0.04	0.042	0.044	0.049	0.056	0.065	0.074	0.083	0.092	0.102	0.112	0.121	0.131	0.141	0.151	0.161	0.17	0.18	0.19	0.200
0.05	0.05	0.051	0.053	0.056	0.06	0.068	0.076	0.085	0.094	0.103	0.113	0.122	0.132	0.141	0.151	0.161	0.171	0.181	0.191	0.201
0.06	0.06	0.061	0.062	0.064	0.067	0.072	0.079	0.087	0.096	0.105	0.114	0.123	0.133	0.142	0.152	0.162	0.171	0.181	0.191	0.201
0.07	0.07	0.07	0.071	0.073	0.075	0.078	0.083	0.09	0.098	0.107	0.116	0.125	0.134	0.143	0.153	0.163	0.172	0.182	0.192	0.201
0.08	0.08	0.08	0.081	0.082	0.084	0.086	0.09	0.095	0.102	0.109	0.118	0.126	0.135	0.144	0.154	0.163	0.173	0.182	0.192	0.202
0.09	0.09	0.09	0.091	0.091	0.093	0.094	0.097	0.101	0.106	0.113	0.121	0.129	0.137	0.146	0.155	0.164	0.174	0.183	0.193	0.203
0.1	0.1	0.1	0.1	0.101	0.102	0.103	0.105	0.108	0.112	0.118	0.124	0.132	0.14	0.148	0.157	0.166	0.175	0.184	0.194	0.203
0.11	0.11	0.11	0.11	0.111	0.111	0.112	0.114	0.116	0.119	0.124	0.129	0.136	0.143	0.151	0.159	0.167	0.176	0.185	0.195	0.204
0.12	0.12	0.12	0.12	0.121	0.121	0.122	0.123	0.125	0.127	0.131	0.135	0.141	0.147	0.154	0.162	0.17	0.178	0.187	0.196	0.205
0.13	0.13	0.13	0.13	0.13	0.131	0.131	0.133	0.134	0.136	0.139	0.142	0.147	0.152	0.158	0.165	0.173	0.181	0.189	0.198	0.207
0.14	0.14	0.14	0.14	0.14	0.141	0.141	0.142	0.143	0.145	0.147	0.15	0.153	0.158	0.163	0.17	0.177	0.184	0.192	0.2	0.209
0.15	0.15	0.15	0.15	0.15	0.15	0.151	0.152	0.153	0.154	0.156	0.158	0.161	0.165	0.169	0.175	0.181	0.188	0.195	0.203	0.211
0.16	0.16	0.16	0.16	0.16	0.16	0.161	0.161	0.162	0.163	0.164	0.166	0.168	0.172	0.176	0.18	0.186	0.192	0.199	0.206	0.214
0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.171	0.172	0.172	0.174	0.175	0.177	0.18	0.183	0.187	0.192	0.197	0.203	0.21	0.217
0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.181	0.181	0.182	0.183	0.184	0.186	0.188	0.191	0.194	0.198	0.202	0.208	0.214	0.221
0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.191	0.191	0.192	0.192	0.193	0.195	0.197	0.199	0.201	0.205	0.209	0.214	0.219	0.225
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.201	0.201	0.202	0.203	0.204	0.205	0.207	0.209	0.212	0.216	0.22	0.225	0.230

Table C.9 Attained Significance Levels: Sample size = 45 ; $\beta = 1$

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.013	0.021	0.031	0.041	0.05	0.06	0.07	0.08	0.09	0.1	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.02	0.021	0.025	0.033	0.042	0.051	0.061	0.071	0.081	0.09	0.1	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.03	0.031	0.033	0.037	0.044	0.053	0.062	0.072	0.081	0.091	0.101	0.111	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.04	0.04	0.041	0.044	0.048	0.055	0.064	0.073	0.082	0.092	0.102	0.111	0.121	0.131	0.141	0.151	0.16	0.17	0.18	0.19	0.200
0.05	0.05	0.051	0.052	0.055	0.06	0.067	0.075	0.084	0.093	0.103	0.112	0.122	0.131	0.141	0.151	0.161	0.171	0.181	0.19	0.200
0.06	0.06	0.061	0.062	0.064	0.066	0.071	0.079	0.087	0.095	0.104	0.113	0.123	0.132	0.142	0.152	0.161	0.171	0.181	0.191	0.201
0.07	0.07	0.07	0.071	0.072	0.074	0.078	0.083	0.09	0.098	0.106	0.115	0.124	0.133	0.143	0.152	0.162	0.172	0.181	0.191	0.201
0.08	0.08	0.08	0.081	0.082	0.083	0.085	0.09	0.095	0.102	0.109	0.117	0.126	0.135	0.144	0.153	0.163	0.172	0.182	0.192	0.202
0.09	0.09	0.09	0.09	0.091	0.093	0.094	0.097	0.101	0.106	0.113	0.12	0.128	0.137	0.145	0.155	0.164	0.173	0.183	0.193	0.202
0.1	0.1	0.1	0.1	0.101	0.102	0.103	0.105	0.108	0.113	0.118	0.124	0.131	0.139	0.147	0.156	0.165	0.174	0.184	0.193	0.203
0.11	0.11	0.11	0.11	0.111	0.111	0.112	0.114	0.116	0.119	0.124	0.129	0.135	0.142	0.15	0.158	0.167	0.176	0.185	0.194	0.204
0.12	0.12	0.12	0.12	0.12	0.121	0.122	0.123	0.125	0.127	0.131	0.135	0.14	0.147	0.154	0.161	0.169	0.178	0.187	0.196	0.205
0.13	0.13	0.13	0.13	0.13	0.131	0.131	0.132	0.134	0.136	0.138	0.142	0.146	0.152	0.158	0.165	0.172	0.18	0.189	0.197	0.207
0.14	0.14	0.14	0.14	0.14	0.14	0.141	0.142	0.143	0.145	0.147	0.149	0.153	0.157	0.163	0.169	0.176	0.184	0.191	0.2	0.208
0.15	0.15	0.15	0.15	0.15	0.15	0.151	0.151	0.152	0.153	0.155	0.157	0.16	0.164	0.169	0.174	0.18	0.187	0.194	0.202	0.211
0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.161	0.162	0.163	0.164	0.166	0.168	0.171	0.175	0.18	0.186	0.192	0.198	0.206	0.213
0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.171	0.171	0.172	0.173	0.175	0.176	0.179	0.183	0.187	0.191	0.197	0.203	0.21	0.217
0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.181	0.182	0.182	0.184	0.185	0.187	0.19	0.194	0.198	0.202	0.208	0.214	0.221
0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.191	0.191	0.192	0.193	0.194	0.196	0.198	0.201	0.205	0.209	0.214	0.219	0.225
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.201	0.201	0.202	0.202	0.203	0.205	0.207	0.209	0.213	0.216	0.22	0.225	0.231

Table C.10 Attained Significance Levels: Sample size = 50 ; $\beta = 1$

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.012	0.021	0.031	0.04	0.05	0.06	0.07	0.08	0.09	0.1	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.02	0.021	0.024	0.033	0.042	0.051	0.061	0.071	0.08	0.09	0.1	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.03	0.03	0.032	0.036	0.044	0.053	0.062	0.072	0.081	0.091	0.101	0.111	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.200
0.04	0.04	0.041	0.043	0.048	0.055	0.064	0.073	0.082	0.092	0.101	0.111	0.121	0.131	0.141	0.151	0.16	0.17	0.18	0.19	0.200
0.05	0.05	0.051	0.052	0.055	0.06	0.067	0.075	0.084	0.093	0.103	0.112	0.122	0.131	0.141	0.151	0.161	0.171	0.181	0.19	0.200
0.06	0.06	0.06	0.061	0.063	0.066	0.071	0.078	0.086	0.095	0.104	0.113	0.123	0.132	0.142	0.152	0.161	0.171	0.181	0.191	0.201
0.07	0.07	0.07	0.071	0.072	0.075	0.078	0.083	0.09	0.098	0.106	0.115	0.124	0.133	0.143	0.152	0.162	0.172	0.181	0.191	0.201
0.08	0.08	0.08	0.081	0.082	0.083	0.086	0.089	0.095	0.102	0.109	0.117	0.126	0.135	0.144	0.153	0.163	0.172	0.182	0.192	0.201
0.09	0.09	0.09	0.09	0.091	0.092	0.094	0.097	0.101	0.106	0.113	0.12	0.128	0.137	0.145	0.155	0.164	0.173	0.183	0.192	0.202
0.1	0.1	0.1	0.1	0.101	0.102	0.103	0.105	0.108	0.112	0.118	0.124	0.131	0.139	0.147	0.156	0.165	0.174	0.184	0.193	0.203
0.11	0.11	0.11	0.11	0.11	0.111	0.112	0.114	0.116	0.119	0.124	0.129	0.135	0.142	0.15	0.158	0.167	0.176	0.185	0.194	0.203
0.12	0.12	0.12	0.12	0.12	0.121	0.121	0.123	0.124	0.127	0.13	0.135	0.14	0.146	0.154	0.161	0.169	0.178	0.186	0.195	0.205
0.13	0.13	0.13	0.13	0.13	0.13	0.131	0.132	0.133	0.135	0.138	0.141	0.146	0.152	0.158	0.165	0.172	0.18	0.188	0.197	0.206
0.14	0.14	0.14	0.14	0.14	0.14	0.141	0.141	0.143	0.144	0.146	0.149	0.153	0.157	0.163	0.169	0.176	0.183	0.191	0.199	0.208
0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.151	0.152	0.153	0.155	0.157	0.16	0.164	0.168	0.174	0.18	0.187	0.194	0.202	0.210
0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.161	0.162	0.163	0.164	0.165	0.168	0.171	0.175	0.179	0.185	0.191	0.198	0.205	0.212
0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.171	0.171	0.172	0.173	0.174	0.176	0.179	0.182	0.186	0.191	0.196	0.202	0.209	0.216
0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.181	0.181	0.182	0.182	0.183	0.185	0.187	0.19	0.193	0.197	0.202	0.207	0.213	0.219
0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.191	0.191	0.192	0.193	0.194	0.195	0.198	0.201	0.204	0.208	0.213	0.218	0.224
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.201	0.201	0.202	0.203	0.204	0.206	0.209	0.211	0.215	0.219	0.224	0.229

Appendix D. Contour Plots for Attained Significance Levels

D.1 Gamma Shape (β) = 0.5

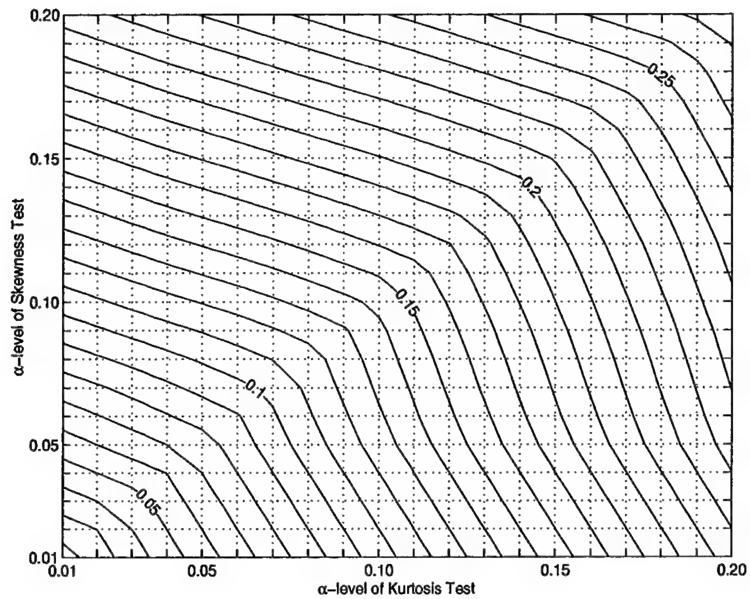


Figure D.1 Sample Size = 5

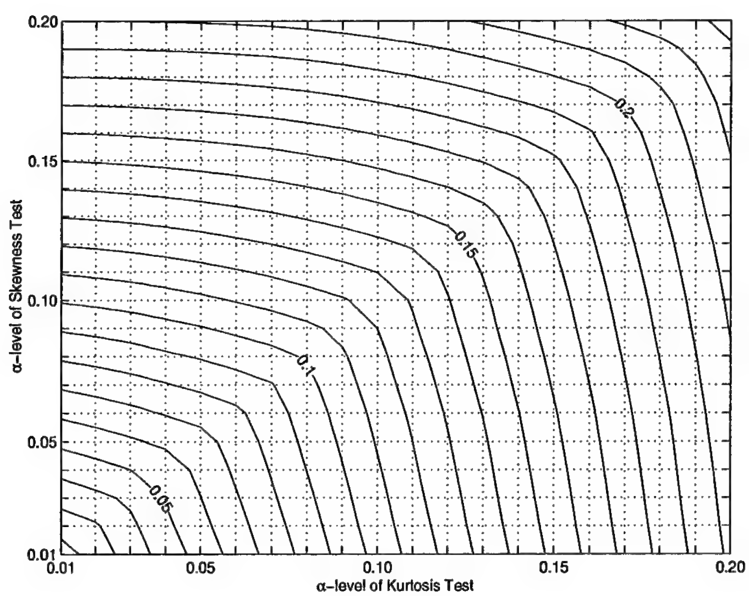


Figure D.2 Sample Size = 10

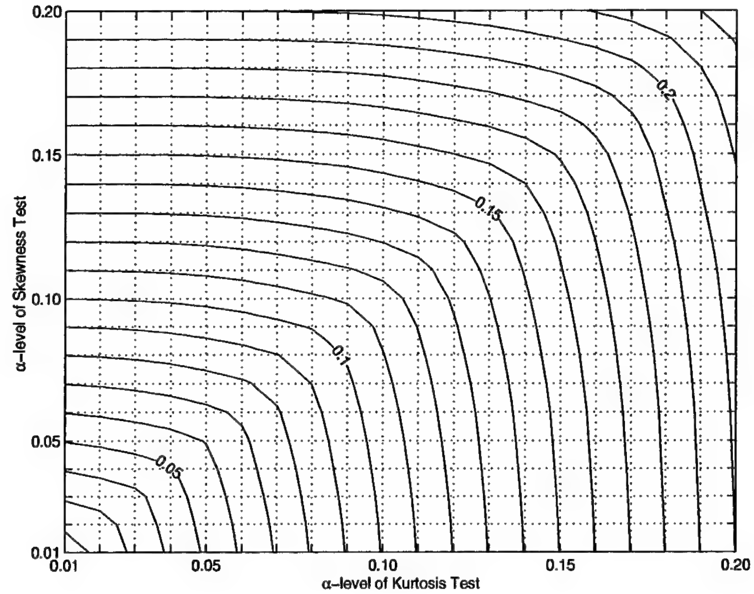


Figure D.3 Sample Size = 15

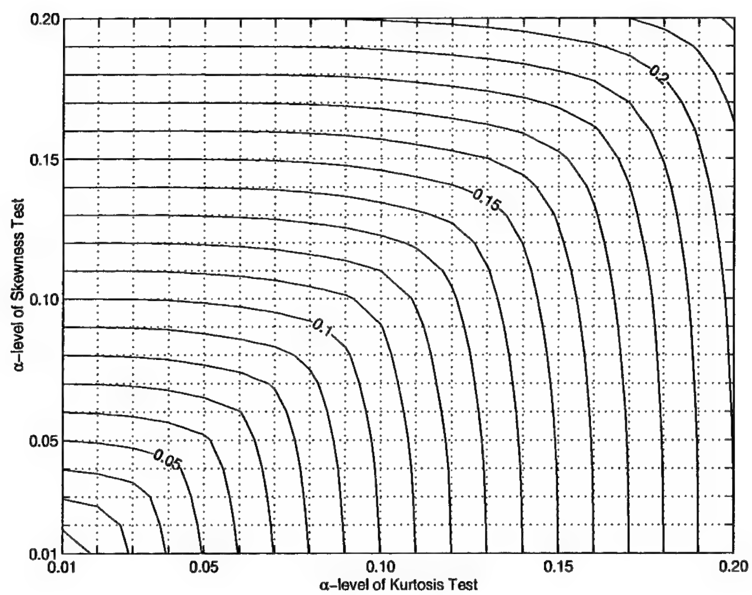


Figure D.4 Sample Size = 20

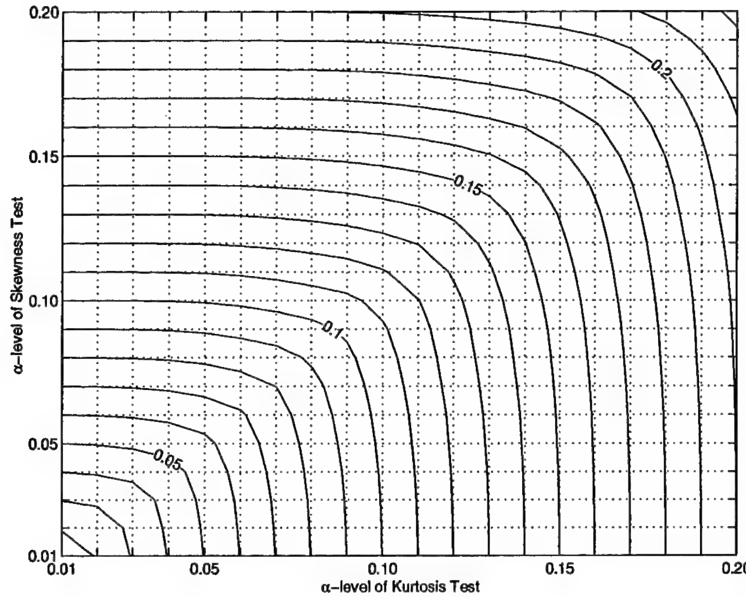


Figure D.5 Sample Size = 25

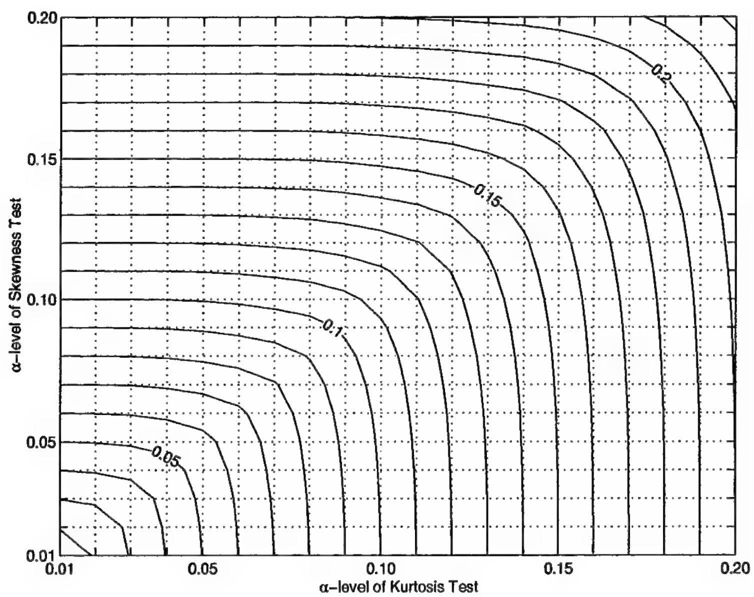


Figure D.6 Sample Size = 30

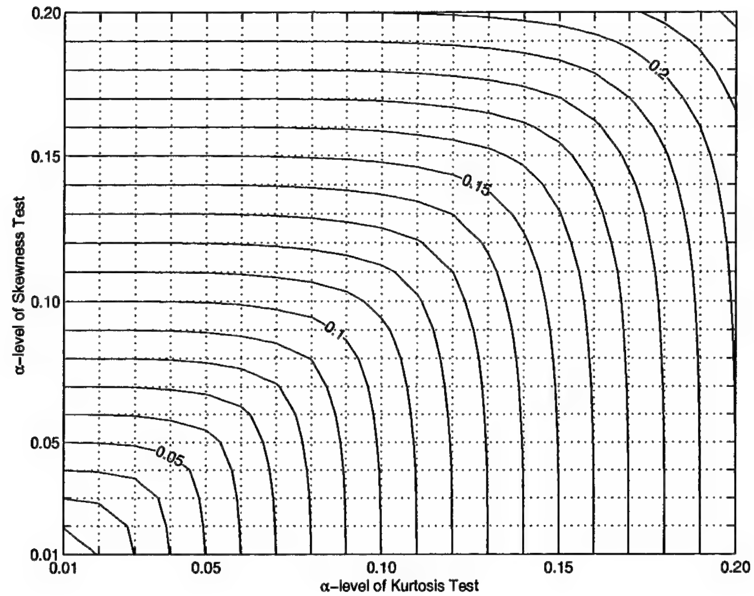


Figure D.7   Sample Size = 35

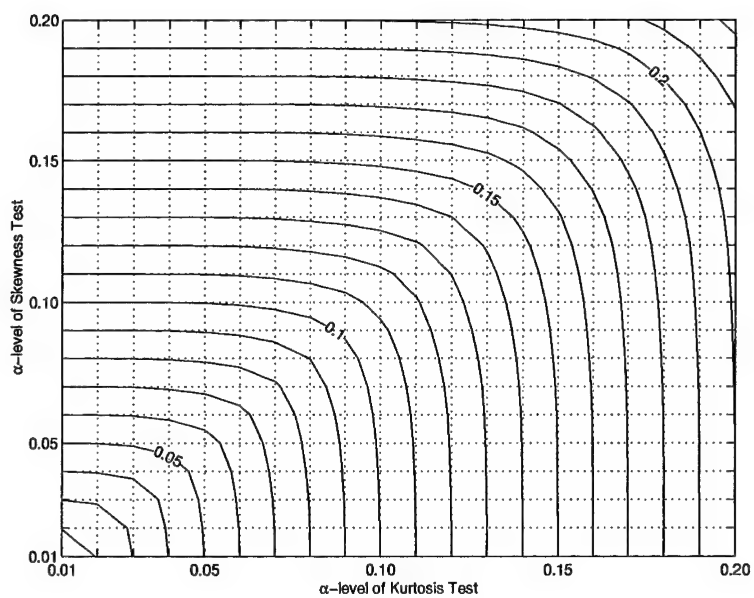


Figure D.8   Sample Size = 40

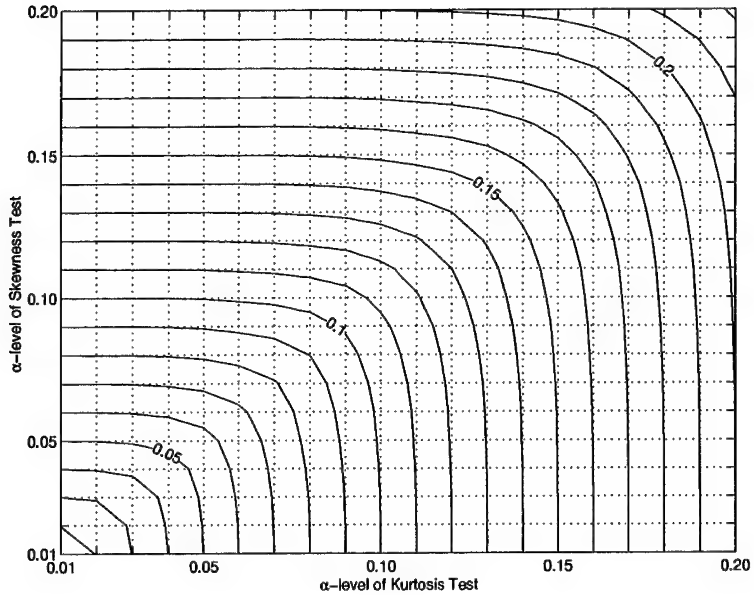


Figure D.9 Sample Size = 45

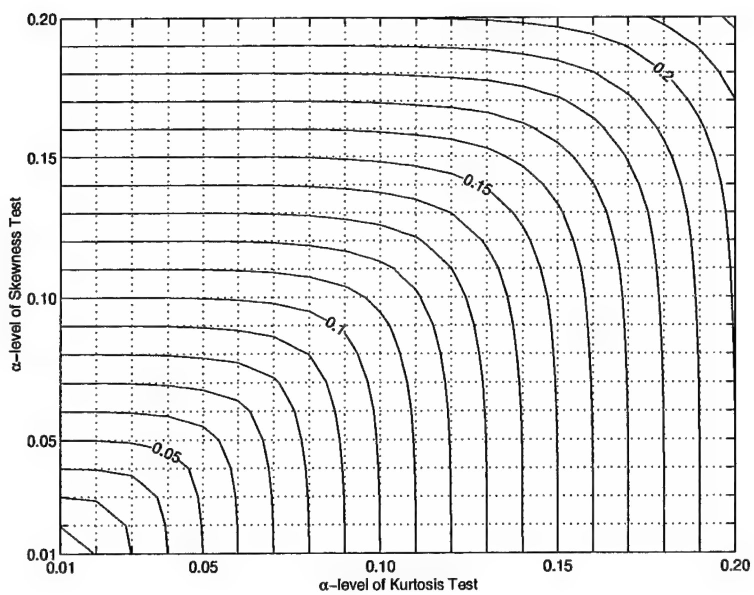


Figure D.10 Sample Size = 50

Appendix E. Sequential Test Power Results

E.1 H_0: Gamma (β =0.5)

Table E.1 Power Study: Sequential Test, $n = 5$ - H_0: Gamma(0.5,1); $H_a : \chi^2(1)$

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.014	0.024	0.034	0.044	0.054	0.064	0.074	0.084	0.094	0.104	0.115	0.125	0.135	0.144	0.155	0.165	0.176	0.186	0.196	0.206
0.02	0.024	0.029	0.039	0.049	0.059	0.069	0.079	0.09	0.099	0.109	0.12	0.13	0.14	0.149	0.16	0.171	0.181	0.191	0.201	0.212
0.03	0.034	0.039	0.044	0.053	0.063	0.073	0.084	0.094	0.104	0.114	0.124	0.135	0.145	0.154	0.165	0.175	0.185	0.196	0.206	0.216
0.04	0.044	0.049	0.054	0.059	0.069	0.079	0.089	0.1	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.181	0.191	0.201	0.212	0.222
0.05	0.054	0.059	0.064	0.069	0.075	0.084	0.095	0.105	0.115	0.125	0.135	0.145	0.156	0.165	0.176	0.186	0.196	0.206	0.216	0.227
0.06	0.064	0.069	0.074	0.078	0.083	0.088	0.098	0.109	0.119	0.129	0.139	0.149	0.159	0.168	0.179	0.189	0.199	0.209	0.22	0.230
0.07	0.074	0.078	0.082	0.087	0.092	0.097	0.102	0.112	0.122	0.132	0.142	0.152	0.162	0.171	0.182	0.192	0.202	0.212	0.222	0.232
0.08	0.084	0.088	0.092	0.097	0.101	0.106	0.111	0.116	0.125	0.135	0.145	0.155	0.165	0.174	0.185	0.195	0.205	0.215	0.225	0.235
0.09	0.095	0.099	0.103	0.107	0.111	0.115	0.12	0.124	0.129	0.138	0.148	0.158	0.168	0.177	0.188	0.198	0.208	0.218	0.228	0.237
0.1	0.105	0.109	0.114	0.118	0.121	0.125	0.13	0.134	0.138	0.143	0.152	0.162	0.172	0.181	0.191	0.201	0.211	0.221	0.231	0.240
0.11	0.115	0.119	0.123	0.128	0.131	0.135	0.139	0.144	0.148	0.152	0.157	0.166	0.176	0.184	0.194	0.204	0.214	0.224	0.234	0.243
0.12	0.125	0.129	0.133	0.138	0.141	0.145	0.149	0.153	0.157	0.161	0.165	0.17	0.179	0.188	0.198	0.207	0.217	0.227	0.237	0.246
0.13	0.135	0.139	0.143	0.148	0.151	0.155	0.159	0.163	0.167	0.171	0.175	0.179	0.185	0.192	0.202	0.212	0.221	0.231	0.24	0.250
0.14	0.145	0.149	0.153	0.157	0.161	0.165	0.169	0.173	0.176	0.18	0.184	0.188	0.193	0.198	0.206	0.216	0.225	0.234	0.244	0.253
0.15	0.155	0.159	0.163	0.167	0.171	0.175	0.179	0.183	0.186	0.19	0.194	0.198	0.202	0.206	0.212	0.22	0.23	0.239	0.248	0.257
0.16	0.165	0.169	0.173	0.177	0.181	0.185	0.189	0.193	0.197	0.2	0.204	0.208	0.212	0.216	0.221	0.226	0.234	0.243	0.252	0.261
0.17	0.175	0.179	0.183	0.187	0.191	0.195	0.199	0.203	0.206	0.21	0.213	0.217	0.221	0.225	0.23	0.234	0.239	0.247	0.256	0.265
0.18	0.185	0.189	0.194	0.198	0.202	0.205	0.209	0.213	0.217	0.22	0.224	0.228	0.232	0.236	0.24	0.244	0.248	0.253	0.261	0.269
0.19	0.196	0.2	0.204	0.208	0.212	0.216	0.22	0.224	0.227	0.231	0.234	0.238	0.242	0.246	0.25	0.254	0.258	0.262	0.267	0.273
0.2	0.206	0.21	0.214	0.218	0.222	0.226	0.23	0.234	0.237	0.241	0.244	0.248	0.252	0.255	0.259	0.263	0.267	0.27	0.274	0.279

Table E.2 Power Study: Sequential Test, $n = 15$ - H_0: Gamma(0.5,1); $H_a : \chi^2(1)$

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.014	0.023	0.032	0.042	0.051	0.061	0.071	0.08	0.09	0.1	0.11	0.12	0.13	0.142	0.151	0.161	0.172	0.182	0.192	0.202
0.02	0.022	0.026	0.034	0.044	0.053	0.062	0.072	0.081	0.09	0.101	0.11	0.12	0.131	0.142	0.152	0.162	0.172	0.182	0.193	0.202
0.03	0.032	0.034	0.038	0.046	0.055	0.064	0.073	0.083	0.091	0.101	0.111	0.121	0.131	0.142	0.152	0.162	0.172	0.183	0.193	0.202
0.04	0.04	0.042	0.045	0.049	0.057	0.066	0.075	0.084	0.093	0.102	0.112	0.122	0.132	0.143	0.153	0.163	0.173	0.183	0.193	0.202
0.05	0.05	0.051	0.054	0.057	0.06	0.068	0.077	0.086	0.094	0.103	0.113	0.123	0.133	0.144	0.153	0.163	0.173	0.184	0.194	0.203
0.06	0.06	0.061	0.063	0.065	0.068	0.071	0.079	0.088	0.096	0.105	0.114	0.124	0.134	0.145	0.154	0.164	0.174	0.184	0.194	0.203
0.07	0.07	0.071	0.072	0.074	0.076	0.079	0.083	0.09	0.098	0.107	0.116	0.125	0.135	0.146	0.155	0.165	0.175	0.185	0.195	0.204
0.08	0.079	0.08	0.081	0.082	0.084	0.086	0.089	0.093	0.1	0.109	0.117	0.127	0.136	0.147	0.156	0.166	0.175	0.186	0.196	0.204
0.09	0.088	0.089	0.089	0.09	0.092	0.094	0.096	0.1	0.104	0.111	0.119	0.128	0.138	0.148	0.157	0.166	0.176	0.186	0.196	0.205
0.1	0.099	0.099	0.1	0.101	0.102	0.104	0.105	0.108	0.111	0.115	0.122	0.131	0.14	0.15	0.159	0.168	0.178	0.188	0.197	0.206
0.11	0.108	0.108	0.109	0.109	0.11	0.112	0.113	0.116	0.118	0.121	0.126	0.133	0.142	0.152	0.16	0.169	0.179	0.189	0.198	0.207
0.12	0.118	0.118	0.119	0.119	0.12	0.121	0.122	0.124	0.127	0.129	0.132	0.137	0.145	0.154	0.162	0.171	0.18	0.19	0.199	0.208
0.13	0.129	0.129	0.129	0.129	0.13	0.131	0.132	0.133	0.135	0.137	0.14	0.144	0.149	0.157	0.164	0.173	0.182	0.192	0.201	0.209
0.14	0.139	0.139	0.14	0.14	0.14	0.141	0.141	0.143	0.144	0.146	0.149	0.151	0.155	0.161	0.167	0.175	0.184	0.193	0.202	0.211
0.15	0.15	0.15	0.151	0.151	0.151	0.151	0.152	0.153	0.154	0.156	0.158	0.16	0.163	0.167	0.171	0.178	0.186	0.195	0.204	0.212
0.16	0.161	0.161	0.161	0.161	0.161	0.161	0.162	0.163	0.164	0.165	0.167	0.169	0.172	0.175	0.178	0.183	0.19	0.198	0.206	0.214
0.17	0.171	0.171	0.171	0.171	0.172	0.172	0.172	0.172	0.173	0.175	0.176	0.178	0.181	0.183	0.186	0.189	0.195	0.201	0.209	0.216
0.18	0.18	0.18	0.18	0.18	0.18	0.181	0.181	0.181	0.182	0.183	0.184	0.186	0.188	0.19	0.193	0.196	0.2	0.205	0.211	0.218
0.19	0.191	0.191	0.191	0.191	0.191	0.191	0.191	0.192	0.192	0.193	0.194	0.196	0.197	0.2	0.201	0.204	0.207	0.211	0.216	0.222
0.2	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.202	0.203	0.204	0.206	0.208	0.209	0.212	0.214	0.217	0.222	0.226

Table E.3 Power Study: Sequential Test, $n = 25$ - H_0: Gamma(0.5,1); $H_a : \chi^2(1)$

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.012	0.021	0.032	0.042	0.052	0.062	0.072	0.083	0.093	0.104	0.115	0.125	0.135	0.145	0.156	0.166	0.175	0.185	0.195	0.205
0.02	0.021	0.024	0.033	0.044	0.053	0.063	0.073	0.084	0.094	0.104	0.115	0.126	0.135	0.145	0.156	0.166	0.175	0.185	0.195	0.205
0.03	0.031	0.033	0.037	0.045	0.054	0.064	0.073	0.084	0.094	0.105	0.115	0.126	0.136	0.145	0.156	0.166	0.175	0.185	0.195	0.205
0.04	0.041	0.042	0.044	0.048	0.056	0.065	0.074	0.085	0.095	0.105	0.116	0.126	0.136	0.146	0.157	0.166	0.175	0.185	0.195	0.205
0.05	0.052	0.052	0.054	0.056	0.06	0.067	0.076	0.086	0.096	0.106	0.116	0.127	0.136	0.146	0.157	0.167	0.175	0.186	0.195	0.205
0.06	0.062	0.062	0.063	0.065	0.067	0.071	0.078	0.088	0.097	0.107	0.117	0.127	0.137	0.146	0.157	0.167	0.175	0.186	0.195	0.205
0.07	0.073	0.073	0.073	0.075	0.076	0.078	0.082	0.091	0.099	0.109	0.119	0.129	0.138	0.147	0.158	0.168	0.176	0.186	0.195	0.205
0.08	0.083	0.083	0.083	0.084	0.085	0.087	0.089	0.095	0.102	0.111	0.12	0.13	0.139	0.148	0.159	0.168	0.176	0.187	0.196	0.205
0.09	0.093	0.093	0.093	0.093	0.094	0.095	0.098	0.101	0.105	0.113	0.122	0.132	0.14	0.149	0.16	0.169	0.177	0.187	0.196	0.206
0.1	0.104	0.104	0.104	0.104	0.104	0.105	0.107	0.109	0.112	0.117	0.125	0.134	0.142	0.151	0.161	0.17	0.178	0.188	0.197	0.206
0.11	0.114	0.114	0.114	0.114	0.115	0.116	0.117	0.119	0.121	0.124	0.13	0.137	0.145	0.152	0.162	0.171	0.179	0.188	0.197	0.207
0.12	0.125	0.125	0.125	0.125	0.126	0.126	0.127	0.129	0.131	0.133	0.136	0.141	0.148	0.155	0.164	0.172	0.18	0.19	0.198	0.208
0.13	0.136	0.136	0.136	0.136	0.136	0.137	0.137	0.139	0.14	0.142	0.144	0.147	0.152	0.158	0.167	0.175	0.182	0.191	0.2	0.209
0.14	0.146	0.146	0.146	0.146	0.146	0.146	0.147	0.148	0.149	0.15	0.152	0.155	0.158	0.163	0.17	0.177	0.184	0.193	0.201	0.210
0.15	0.156	0.156	0.156	0.156	0.156	0.156	0.156	0.157	0.158	0.159	0.16	0.162	0.165	0.168	0.174	0.18	0.186	0.195	0.203	0.211
0.16	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.166	0.166	0.167	0.169	0.17	0.172	0.175	0.179	0.185	0.19	0.198	0.205	0.213
0.17	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.176	0.177	0.178	0.179	0.181	0.183	0.186	0.19	0.194	0.201	0.208	0.216
0.18	0.184	0.184	0.184	0.184	0.184	0.184	0.185	0.185	0.185	0.186	0.187	0.188	0.189	0.191	0.193	0.196	0.199	0.205	0.211	0.218
0.19	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.196	0.196	0.197	0.198	0.2	0.202	0.204	0.207	0.211	0.216	0.222
0.2	0.205	0.205	0.205	0.205	0.205	0.205	0.205	0.205	0.205	0.206	0.206	0.207	0.208	0.209	0.211	0.213	0.215	0.218	0.222	0.227

Table E.4 Power Study: Sequential Test, $n = 50$ - H_0: Gamma(0.5,1); $H_a : \chi^2(1)$

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.011	0.02	0.028	0.038	0.047	0.058	0.068	0.078	0.088	0.099	0.109	0.118	0.128	0.137	0.148	0.158	0.168	0.178	0.189	0.199
0.02	0.019	0.022	0.03	0.038	0.047	0.058	0.068	0.078	0.088	0.099	0.109	0.118	0.128	0.138	0.148	0.158	0.168	0.178	0.189	0.199
0.03	0.029	0.03	0.033	0.04	0.048	0.058	0.068	0.079	0.089	0.099	0.109	0.118	0.128	0.138	0.148	0.158	0.168	0.178	0.189	0.199
0.04	0.038	0.038	0.04	0.042	0.05	0.059	0.069	0.079	0.089	0.099	0.109	0.118	0.128	0.138	0.148	0.158	0.168	0.178	0.189	0.199
0.05	0.048	0.048	0.049	0.05	0.054	0.061	0.07	0.08	0.09	0.099	0.109	0.119	0.129	0.138	0.148	0.158	0.169	0.178	0.189	0.199
0.06	0.058	0.058	0.059	0.059	0.061	0.065	0.072	0.081	0.09	0.1	0.11	0.119	0.129	0.138	0.149	0.158	0.169	0.178	0.189	0.199
0.07	0.067	0.067	0.067	0.068	0.069	0.071	0.076	0.083	0.092	0.101	0.11	0.119	0.129	0.138	0.149	0.159	0.169	0.179	0.189	0.199
0.08	0.077	0.077	0.077	0.077	0.078	0.079	0.082	0.087	0.094	0.103	0.112	0.12	0.13	0.139	0.149	0.159	0.169	0.179	0.189	0.200
0.09	0.087	0.087	0.087	0.087	0.087	0.088	0.09	0.093	0.098	0.105	0.114	0.122	0.131	0.14	0.15	0.16	0.17	0.179	0.19	0.200
0.1	0.097	0.097	0.097	0.097	0.097	0.097	0.098	0.101	0.104	0.11	0.117	0.124	0.133	0.141	0.151	0.16	0.17	0.18	0.19	0.200
0.11	0.106	0.106	0.106	0.106	0.107	0.107	0.108	0.109	0.111	0.115	0.121	0.127	0.135	0.143	0.152	0.162	0.171	0.18	0.19	0.201
0.12	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.118	0.12	0.122	0.127	0.132	0.139	0.146	0.155	0.163	0.172	0.181	0.191	0.201
0.13	0.127	0.127	0.127	0.127	0.127	0.127	0.128	0.128	0.129	0.131	0.134	0.137	0.143	0.149	0.157	0.166	0.174	0.183	0.192	0.202
0.14	0.137	0.137	0.137	0.137	0.137	0.137	0.137	0.138	0.138	0.139	0.141	0.144	0.149	0.154	0.161	0.168	0.177	0.184	0.193	0.203
0.15	0.146	0.146	0.146	0.146	0.146	0.146	0.146	0.146	0.147	0.148	0.149	0.151	0.155	0.159	0.165	0.172	0.179	0.187	0.195	0.204
0.16	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.156	0.156	0.157	0.158	0.159	0.162	0.165	0.17	0.176	0.183	0.19	0.198	0.206
0.17	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.168	0.168	0.169	0.169	0.171	0.174	0.177	0.182	0.188	0.194	0.201	0.209
0.18	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.179	0.179	0.18	0.181	0.183	0.186	0.19	0.194	0.199	0.206	0.213
0.19	0.189	0.189	0.189	0.189	0.189	0.189	0.189	0.189	0.189	0.189	0.19	0.19	0.191	0.193	0.195	0.197	0.201	0.205	0.211	0.217
0.2	0.199	0.199	0.199	0.199	0.199	0.199	0.2	0.2	0.2	0.2	0.2	0.2	0.201	0.202	0.203	0.205	0.208	0.212	0.216	0.222

Table E.5 Power Study: Sequential Test, $n = 5$ - H_0: Gamma(0.5,1); H_a: Xdouble-Exp.

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.046	0.064	0.079	0.094	0.109	0.121	0.133	0.143	0.154	0.165	0.175	0.185	0.194	0.205	0.215	0.225	0.235	0.244	0.253	0.263
	0.02	0.07	0.072	0.088	0.103	0.118	0.13	0.141	0.152	0.162	0.173	0.184	0.194	0.203	0.213	0.223	0.233	0.243	0.252	0.261	0.271
	0.03	0.09	0.093	0.096	0.111	0.126	0.138	0.149	0.16	0.171	0.182	0.192	0.202	0.211	0.222	0.232	0.242	0.251	0.261	0.27	0.280
	0.04	0.11	0.112	0.116	0.119	0.134	0.146	0.157	0.168	0.179	0.189	0.2	0.21	0.219	0.23	0.24	0.25	0.259	0.269	0.278	0.287
	0.05	0.129	0.132	0.135	0.138	0.142	0.154	0.165	0.175	0.186	0.197	0.208	0.217	0.227	0.237	0.247	0.257	0.267	0.276	0.285	0.295
	0.06	0.145	0.147	0.15	0.153	0.156	0.16	0.17	0.18	0.191	0.202	0.212	0.222	0.231	0.242	0.252	0.262	0.271	0.28	0.289	0.299
	0.07	0.157	0.159	0.162	0.165	0.168	0.171	0.174	0.184	0.195	0.205	0.216	0.225	0.234	0.245	0.255	0.265	0.274	0.283	0.292	0.302
	0.08	0.171	0.172	0.175	0.178	0.18	0.183	0.185	0.189	0.199	0.21	0.22	0.23	0.239	0.249	0.259	0.269	0.278	0.287	0.296	0.306
	0.09	0.183	0.185	0.188	0.19	0.193	0.195	0.197	0.2	0.204	0.214	0.224	0.234	0.243	0.253	0.263	0.273	0.282	0.291	0.3	0.310
	0.1	0.196	0.198	0.2	0.203	0.206	0.208	0.21	0.213	0.215	0.219	0.229	0.238	0.247	0.257	0.267	0.276	0.286	0.295	0.304	0.313
	0.11	0.208	0.21	0.213	0.215	0.218	0.22	0.222	0.225	0.227	0.23	0.234	0.243	0.252	0.261	0.271	0.281	0.29	0.299	0.307	0.317
	0.12	0.22	0.222	0.224	0.227	0.229	0.232	0.234	0.236	0.239	0.242	0.244	0.248	0.256	0.265	0.275	0.285	0.294	0.302	0.311	0.320
	0.13	0.232	0.234	0.236	0.239	0.241	0.244	0.246	0.248	0.25	0.253	0.256	0.258	0.262	0.27	0.28	0.289	0.298	0.307	0.315	0.325
	0.14	0.243	0.245	0.247	0.25	0.253	0.255	0.257	0.259	0.262	0.264	0.267	0.269	0.272	0.276	0.284	0.294	0.303	0.311	0.319	0.329
	0.15	0.255	0.257	0.259	0.262	0.264	0.267	0.269	0.271	0.273	0.276	0.278	0.28	0.283	0.286	0.29	0.298	0.307	0.315	0.324	0.333
	0.16	0.266	0.268	0.271	0.273	0.276	0.278	0.28	0.282	0.285	0.287	0.29	0.292	0.294	0.297	0.3	0.304	0.311	0.319	0.328	0.337
	0.17	0.277	0.278	0.281	0.284	0.286	0.288	0.29	0.293	0.295	0.298	0.3	0.302	0.305	0.307	0.31	0.313	0.317	0.324	0.332	0.341
	0.18	0.287	0.289	0.291	0.294	0.297	0.299	0.301	0.303	0.306	0.308	0.31	0.312	0.315	0.317	0.32	0.323	0.325	0.33	0.336	0.345
	0.19	0.297	0.299	0.302	0.304	0.307	0.309	0.311	0.314	0.316	0.319	0.321	0.323	0.325	0.328	0.33	0.333	0.335	0.338	0.343	0.350
	0.2	0.308	0.31	0.312	0.315	0.318	0.32	0.322	0.324	0.326	0.329	0.331	0.333	0.336	0.338	0.341	0.343	0.346	0.348	0.351	0.356

Table E.6 Power Study: Sequential Test, $n = 15$ - H_0: Gamma(0.5,1); H_a: Xdouble-Exp.

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.197	0.228	0.253	0.272	0.29	0.304	0.319	0.33	0.343	0.354	0.365	0.376	0.387	0.398	0.408	0.418	0.427	0.437	0.445	0.453
	0.02	0.235	0.236	0.257	0.276	0.293	0.308	0.322	0.333	0.345	0.357	0.367	0.378	0.389	0.4	0.41	0.419	0.428	0.438	0.446	0.454
	0.03	0.262	0.262	0.264	0.278	0.295	0.31	0.324	0.335	0.347	0.358	0.369	0.379	0.39	0.401	0.411	0.42	0.429	0.438	0.446	0.454
	0.04	0.283	0.283	0.284	0.286	0.298	0.313	0.327	0.337	0.349	0.36	0.371	0.381	0.392	0.402	0.412	0.421	0.431	0.44	0.448	0.456
	0.05	0.302	0.302	0.303	0.303	0.305	0.315	0.329	0.339	0.351	0.362	0.372	0.382	0.393	0.404	0.413	0.422	0.432	0.441	0.448	0.456
	0.06	0.32	0.32	0.32	0.321	0.321	0.323	0.332	0.342	0.354	0.364	0.374	0.384	0.395	0.405	0.415	0.424	0.433	0.442	0.45	0.458
	0.07	0.336	0.336	0.336	0.336	0.336	0.337	0.34	0.346	0.356	0.367	0.376	0.386	0.397	0.407	0.416	0.425	0.434	0.443	0.451	0.459
	0.08	0.348	0.348	0.348	0.348	0.349	0.349	0.349	0.352	0.359	0.368	0.378	0.388	0.398	0.408	0.418	0.427	0.435	0.444	0.452	0.460
	0.09	0.362	0.362	0.362	0.362	0.363	0.363	0.363	0.364	0.367	0.373	0.381	0.39	0.4	0.41	0.419	0.428	0.437	0.446	0.453	0.461
	0.1	0.376	0.376	0.376	0.376	0.376	0.376	0.376	0.377	0.378	0.381	0.386	0.393	0.402	0.412	0.421	0.43	0.439	0.448	0.455	0.463
	0.11	0.388	0.388	0.388	0.388	0.388	0.388	0.389	0.389	0.389	0.391	0.393	0.398	0.405	0.414	0.422	0.431	0.44	0.448	0.456	0.463
	0.12	0.399	0.399	0.399	0.399	0.399	0.4	0.4	0.4	0.401	0.401	0.402	0.405	0.41	0.417	0.424	0.433	0.441	0.45	0.457	0.465
	0.13	0.411	0.411	0.411	0.411	0.411	0.411	0.412	0.412	0.412	0.413	0.413	0.414	0.417	0.422	0.428	0.435	0.442	0.451	0.458	0.466
	0.14	0.422	0.422	0.422	0.422	0.422	0.422	0.422	0.422	0.422	0.423	0.423	0.424	0.425	0.428	0.432	0.438	0.445	0.453	0.46	0.467
	0.15	0.432	0.432	0.432	0.432	0.432	0.432	0.432	0.433	0.433	0.433	0.433	0.434	0.434	0.436	0.439	0.443	0.449	0.456	0.462	0.469
	0.16	0.442	0.442	0.442	0.442	0.442	0.442	0.442	0.442	0.442	0.443	0.443	0.443	0.444	0.444	0.447	0.449	0.454	0.46	0.465	0.471
	0.17	0.451	0.451	0.451	0.451	0.451	0.451	0.452	0.452	0.452	0.452	0.452	0.452	0.453	0.453	0.455	0.456	0.459	0.464	0.468	0.474
	0.18	0.461	0.461	0.461	0.461	0.461	0.461	0.461	0.461	0.461	0.461	0.461	0.462	0.462	0.462	0.463	0.464	0.466	0.469	0.473	0.477
	0.19	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.471	0.471	0.471	0.471	0.472	0.473	0.474	0.476	0.479	0.483
	0.2	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.479	0.479	0.479	0.479	0.479	0.479	0.48	0.48	0.481	0.481	0.483	0.485	0.487

Table E.7 Power Study: Sequential Test, $n = 25$ - H_0: Gamma(0.5,1); H_a: Xdouble-Exp.

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.276	0.31	0.337	0.358	0.377	0.393	0.406	0.419	0.432	0.445	0.457	0.469	0.48	0.49	0.5	0.509	0.518	0.528	0.538	0.546
0.02	0.319	0.32	0.339	0.359	0.378	0.394	0.407	0.42	0.433	0.446	0.458	0.469	0.48	0.49	0.5	0.509	0.518	0.528	0.538	0.546
0.03	0.349	0.349	0.35	0.362	0.378	0.394	0.407	0.421	0.433	0.446	0.458	0.47	0.48	0.49	0.501	0.509	0.518	0.528	0.538	0.546
0.04	0.371	0.371	0.371	0.372	0.382	0.395	0.408	0.421	0.434	0.446	0.459	0.47	0.481	0.491	0.501	0.51	0.518	0.529	0.538	0.547
0.05	0.392	0.392	0.392	0.392	0.393	0.401	0.41	0.422	0.435	0.447	0.459	0.471	0.481	0.491	0.501	0.51	0.519	0.529	0.539	0.547
0.06	0.411	0.411	0.411	0.411	0.411	0.413	0.418	0.426	0.437	0.448	0.46	0.471	0.482	0.492	0.502	0.51	0.519	0.529	0.539	0.547
0.07	0.426	0.426	0.426	0.426	0.426	0.427	0.428	0.433	0.441	0.45	0.461	0.472	0.482	0.492	0.502	0.511	0.519	0.529	0.539	0.547
0.08	0.441	0.441	0.441	0.441	0.441	0.441	0.441	0.443	0.448	0.455	0.464	0.474	0.483	0.493	0.503	0.511	0.52	0.53	0.539	0.548
0.09	0.457	0.457	0.457	0.457	0.457	0.457	0.457	0.458	0.46	0.464	0.471	0.478	0.487	0.495	0.504	0.512	0.52	0.53	0.54	0.548
0.1	0.472	0.472	0.472	0.472	0.472	0.472	0.472	0.472	0.472	0.474	0.479	0.484	0.491	0.498	0.506	0.514	0.521	0.531	0.54	0.548
0.11	0.486	0.486	0.486	0.486	0.486	0.486	0.486	0.487	0.487	0.487	0.49	0.494	0.498	0.504	0.511	0.518	0.525	0.533	0.542	0.549
0.12	0.499	0.499	0.499	0.499	0.499	0.499	0.499	0.499	0.499	0.5	0.501	0.503	0.506	0.511	0.517	0.522	0.528	0.536	0.544	0.551
0.13	0.513	0.513	0.513	0.513	0.513	0.513	0.513	0.514	0.514	0.514	0.514	0.516	0.517	0.521	0.525	0.529	0.534	0.541	0.549	0.555
0.14	0.527	0.527	0.527	0.527	0.527	0.527	0.527	0.527	0.527	0.527	0.528	0.528	0.529	0.531	0.534	0.537	0.541	0.547	0.554	0.560
0.15	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.54	0.541	0.543	0.546	0.549	0.554	0.559	0.564
0.16	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.551	0.552	0.554	0.556	0.56	0.565	0.569
0.17	0.561	0.561	0.561	0.561	0.561	0.561	0.561	0.561	0.561	0.561	0.561	0.561	0.562	0.562	0.563	0.564	0.565	0.568	0.572	0.576
0.18	0.571	0.571	0.571	0.571	0.571	0.571	0.571	0.571	0.571	0.571	0.572	0.572	0.572	0.572	0.573	0.573	0.574	0.577	0.58	0.583
0.19	0.582	0.582	0.582	0.582	0.582	0.582	0.582	0.582	0.582	0.582	0.582	0.582	0.582	0.582	0.583	0.583	0.584	0.586	0.588	0.590
0.2	0.591	0.591	0.591	0.591	0.591	0.591	0.591	0.591	0.591	0.591	0.591	0.591	0.591	0.591	0.591	0.591	0.592	0.593	0.595	0.597

Table E.8 Power Study: Sequential Test, $n = 50$ - H_0: Gamma(0.5,1); H_a: Xdouble-Exp.

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.42	0.443	0.474	0.507	0.536	0.561	0.584	0.603	0.62	0.636	0.65	0.663	0.675	0.686	0.696	0.706	0.716	0.725	0.733	0.741
0.02	0.483	0.483	0.493	0.514	0.537	0.561	0.584	0.603	0.62	0.636	0.65	0.663	0.675	0.686	0.696	0.706	0.716	0.725	0.733	0.741
0.03	0.526	0.526	0.527	0.534	0.547	0.564	0.584	0.603	0.62	0.637	0.65	0.663	0.675	0.686	0.696	0.706	0.716	0.725	0.733	0.741
0.04	0.561	0.561	0.561	0.562	0.567	0.576	0.589	0.604	0.62	0.637	0.65	0.663	0.675	0.686	0.696	0.706	0.716	0.725	0.733	0.741
0.05	0.588	0.588	0.588	0.588	0.589	0.593	0.601	0.611	0.622	0.637	0.651	0.663	0.675	0.686	0.696	0.706	0.716	0.725	0.733	0.741
0.06	0.614	0.614	0.614	0.614	0.614	0.615	0.618	0.623	0.631	0.641	0.651	0.663	0.675	0.686	0.696	0.706	0.716	0.725	0.733	0.741
0.07	0.636	0.636	0.636	0.636	0.636	0.636	0.637	0.639	0.644	0.65	0.657	0.666	0.676	0.686	0.696	0.707	0.716	0.725	0.733	0.741
0.08	0.653	0.653	0.653	0.653	0.653	0.653	0.653	0.654	0.657	0.66	0.666	0.672	0.68	0.688	0.697	0.707	0.717	0.725	0.733	0.741
0.09	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.672	0.674	0.677	0.681	0.686	0.692	0.699	0.708	0.717	0.726	0.734	0.742
0.1	0.684	0.684	0.684	0.684	0.684	0.684	0.684	0.684	0.685	0.685	0.688	0.69	0.694	0.699	0.704	0.711	0.719	0.727	0.734	0.742
0.11	0.697	0.697	0.697	0.697	0.697	0.697	0.697	0.697	0.697	0.697	0.698	0.7	0.703	0.707	0.711	0.716	0.722	0.729	0.735	0.743
0.12	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.712	0.713	0.714	0.717	0.719	0.723	0.728	0.733	0.738	0.744
0.13	0.723	0.723	0.723	0.723	0.723	0.723	0.723	0.723	0.723	0.723	0.724	0.724	0.725	0.727	0.729	0.731	0.734	0.738	0.742	0.747
0.14	0.733	0.733	0.733	0.733	0.733	0.733	0.733	0.733	0.733	0.733	0.734	0.734	0.734	0.735	0.737	0.738	0.741	0.744	0.747	0.751
0.15	0.743	0.743	0.743	0.743	0.743	0.743	0.743	0.743	0.743	0.743	0.743	0.743	0.743	0.744	0.745	0.746	0.748	0.75	0.753	0.756
0.16	0.752	0.752	0.752	0.752	0.752	0.752	0.752	0.752	0.752	0.752	0.752	0.752	0.752	0.752	0.753	0.753	0.755	0.757	0.759	0.761
0.17	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.761	0.761	0.761	0.763	0.764	0.765	0.767
0.18	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.769	0.769	0.77	0.771	0.773
0.19	0.776	0.776	0.776	0.776	0.776	0.776	0.776	0.776	0.776	0.776	0.776	0.776	0.776	0.776	0.776	0.776	0.777	0.777	0.778	0.779
0.2	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.784	0.785	0.785

Table E.9 Power Study: Sequential Test, $n = 5$ - H_0: Gamma(0.5,1); H_a: XLogistic(0,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.056	0.081	0.103	0.121	0.139	0.155	0.168	0.182	0.195	0.207	0.22	0.232	0.244	0.255	0.266	0.277	0.287	0.297	0.308	0.319
0.02	0.081	0.085	0.106	0.125	0.142	0.158	0.172	0.185	0.199	0.211	0.224	0.235	0.247	0.258	0.27	0.281	0.29	0.301	0.311	0.322
0.03	0.103	0.106	0.111	0.129	0.146	0.162	0.175	0.189	0.203	0.215	0.227	0.239	0.251	0.262	0.273	0.285	0.294	0.305	0.315	0.326
0.04	0.121	0.124	0.128	0.133	0.15	0.166	0.179	0.193	0.206	0.218	0.231	0.243	0.255	0.266	0.277	0.288	0.298	0.308	0.319	0.330
0.05	0.138	0.141	0.146	0.15	0.154	0.169	0.182	0.196	0.21	0.222	0.234	0.246	0.258	0.269	0.28	0.292	0.301	0.312	0.322	0.333
0.06	0.154	0.157	0.161	0.165	0.169	0.173	0.185	0.199	0.212	0.224	0.237	0.249	0.261	0.272	0.283	0.294	0.304	0.314	0.324	0.335
0.07	0.167	0.17	0.174	0.178	0.181	0.185	0.188	0.201	0.214	0.226	0.239	0.251	0.262	0.273	0.285	0.296	0.305	0.316	0.326	0.337
0.08	0.18	0.183	0.187	0.19	0.193	0.197	0.2	0.204	0.216	0.228	0.241	0.252	0.264	0.275	0.286	0.298	0.307	0.317	0.328	0.339
0.09	0.192	0.195	0.199	0.202	0.205	0.208	0.211	0.215	0.22	0.231	0.243	0.255	0.266	0.277	0.288	0.3	0.309	0.319	0.33	0.340
0.1	0.204	0.207	0.211	0.214	0.217	0.22	0.223	0.226	0.23	0.234	0.245	0.257	0.269	0.279	0.291	0.302	0.311	0.321	0.332	0.342
0.11	0.218	0.221	0.224	0.227	0.23	0.233	0.236	0.239	0.243	0.246	0.25	0.26	0.271	0.282	0.293	0.304	0.313	0.323	0.334	0.344
0.12	0.228	0.231	0.235	0.238	0.241	0.244	0.247	0.25	0.253	0.256	0.26	0.264	0.274	0.285	0.296	0.307	0.316	0.326	0.336	0.346
0.13	0.24	0.243	0.246	0.249	0.252	0.255	0.258	0.261	0.264	0.267	0.271	0.274	0.278	0.287	0.298	0.309	0.318	0.328	0.338	0.348
0.14	0.251	0.254	0.257	0.26	0.263	0.266	0.269	0.272	0.275	0.278	0.281	0.285	0.287	0.292	0.301	0.312	0.321	0.331	0.341	0.351
0.15	0.263	0.266	0.269	0.272	0.275	0.278	0.281	0.284	0.287	0.29	0.293	0.296	0.299	0.302	0.307	0.315	0.324	0.333	0.344	0.354
0.16	0.274	0.277	0.28	0.283	0.286	0.289	0.292	0.295	0.298	0.301	0.304	0.307	0.31	0.313	0.316	0.32	0.327	0.336	0.346	0.356
0.17	0.282	0.285	0.289	0.292	0.295	0.298	0.301	0.304	0.307	0.31	0.313	0.316	0.319	0.322	0.325	0.328	0.332	0.339	0.349	0.359
0.18	0.293	0.296	0.3	0.303	0.306	0.309	0.312	0.315	0.318	0.321	0.324	0.326	0.329	0.332	0.335	0.338	0.341	0.345	0.352	0.362
0.19	0.304	0.307	0.31	0.314	0.316	0.319	0.322	0.325	0.328	0.331	0.334	0.337	0.339	0.342	0.345	0.348	0.35	0.353	0.357	0.365
0.2	0.313	0.316	0.32	0.323	0.326	0.329	0.332	0.335	0.338	0.341	0.344	0.346	0.349	0.352	0.355	0.357	0.36	0.362	0.365	0.370

Table E.10 Power Study: Sequential Test, $n = 15$ - H_0: Gamma(0.5,1); H_a: XLogistic(0,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.206	0.239	0.265	0.284	0.303	0.318	0.333	0.345	0.356	0.369	0.38	0.392	0.402	0.412	0.422	0.432	0.442	0.451	0.459	0.468
0.02	0.244	0.245	0.266	0.285	0.304	0.318	0.333	0.345	0.357	0.369	0.38	0.392	0.403	0.412	0.422	0.433	0.442	0.451	0.459	0.468
0.03	0.269	0.27	0.271	0.285	0.304	0.319	0.333	0.345	0.357	0.369	0.38	0.392	0.403	0.412	0.423	0.433	0.442	0.451	0.459	0.468
0.04	0.29	0.29	0.291	0.292	0.305	0.319	0.334	0.346	0.357	0.369	0.38	0.392	0.403	0.412	0.423	0.433	0.442	0.451	0.459	0.468
0.05	0.308	0.309	0.309	0.31	0.312	0.32	0.334	0.346	0.358	0.37	0.381	0.393	0.403	0.413	0.423	0.433	0.442	0.451	0.459	0.468
0.06	0.324	0.325	0.325	0.326	0.327	0.328	0.336	0.347	0.358	0.37	0.381	0.393	0.403	0.413	0.423	0.433	0.442	0.451	0.46	0.468
0.07	0.339	0.339	0.34	0.34	0.341	0.342	0.343	0.349	0.359	0.371	0.381	0.393	0.404	0.413	0.424	0.433	0.442	0.451	0.46	0.468
0.08	0.351	0.351	0.351	0.352	0.352	0.353	0.354	0.355	0.362	0.371	0.382	0.394	0.404	0.414	0.424	0.434	0.442	0.451	0.46	0.468
0.09	0.364	0.364	0.365	0.365	0.366	0.366	0.367	0.367	0.37	0.375	0.383	0.394	0.405	0.414	0.424	0.434	0.443	0.452	0.46	0.469
0.1	0.377	0.377	0.377	0.378	0.378	0.379	0.379	0.38	0.381	0.382	0.387	0.396	0.405	0.415	0.425	0.434	0.443	0.452	0.46	0.469
0.11	0.39	0.39	0.39	0.39	0.39	0.391	0.391	0.392	0.392	0.393	0.396	0.401	0.408	0.416	0.425	0.435	0.444	0.452	0.461	0.469
0.12	0.402	0.402	0.402	0.402	0.402	0.402	0.403	0.403	0.404	0.405	0.406	0.408	0.412	0.418	0.426	0.436	0.444	0.453	0.461	0.469
0.13	0.413	0.413	0.413	0.413	0.413	0.413	0.414	0.414	0.415	0.416	0.416	0.417	0.42	0.423	0.43	0.437	0.445	0.453	0.461	0.470
0.14	0.423	0.423	0.423	0.423	0.423	0.423	0.424	0.424	0.425	0.425	0.426	0.427	0.428	0.43	0.434	0.44	0.447	0.454	0.462	0.470
0.15	0.434	0.434	0.434	0.434	0.434	0.434	0.434	0.435	0.435	0.436	0.437	0.437	0.438	0.439	0.441	0.445	0.45	0.456	0.463	0.471
0.16	0.443	0.443	0.443	0.443	0.443	0.443	0.443	0.444	0.444	0.444	0.445	0.445	0.446	0.447	0.448	0.451	0.454	0.459	0.465	0.472
0.17	0.453	0.453	0.453	0.453	0.453	0.453	0.453	0.453	0.454	0.454	0.454	0.455	0.455	0.456	0.457	0.458	0.46	0.464	0.469	0.475
0.18	0.461	0.461	0.461	0.461	0.461	0.461	0.461	0.462	0.462	0.462	0.463	0.463	0.463	0.464	0.465	0.466	0.467	0.469	0.473	0.478
0.19	0.471	0.471	0.471	0.471	0.471	0.471	0.471	0.471	0.471	0.472	0.472	0.472	0.473	0.473	0.474	0.474	0.475	0.477	0.479	0.483
0.2	0.479	0.479	0.479	0.479	0.479	0.479	0.479	0.479	0.479	0.48	0.48	0.48	0.481	0.481	0.482	0.482	0.483	0.484	0.486	0.488

Table E.11 Power Study: Sequential Test, $n = 25$ - H_0: Gamma(0.5,1); H_a: XLogistic(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.286	0.321	0.348	0.37	0.387	0.405	0.418	0.433	0.446	0.458	0.47	0.481	0.491	0.502	0.513	0.522	0.531	0.541	0.549	0.558
0.02	0.33	0.331	0.348	0.37	0.387	0.405	0.418	0.433	0.446	0.458	0.47	0.481	0.491	0.502	0.513	0.522	0.531	0.541	0.549	0.558
0.03	0.36	0.36	0.361	0.371	0.387	0.405	0.418	0.433	0.446	0.458	0.47	0.481	0.491	0.502	0.513	0.522	0.531	0.541	0.549	0.558
0.04	0.381	0.382	0.382	0.383	0.391	0.405	0.418	0.433	0.446	0.458	0.47	0.481	0.491	0.502	0.513	0.522	0.531	0.541	0.549	0.558
0.05	0.402	0.402	0.402	0.403	0.404	0.41	0.42	0.433	0.446	0.458	0.47	0.481	0.491	0.502	0.513	0.522	0.531	0.541	0.549	0.558
0.06	0.421	0.421	0.421	0.421	0.421	0.423	0.427	0.436	0.447	0.458	0.47	0.481	0.491	0.502	0.513	0.522	0.531	0.541	0.549	0.558
0.07	0.437	0.437	0.437	0.438	0.438	0.438	0.439	0.444	0.451	0.46	0.471	0.481	0.492	0.502	0.513	0.522	0.531	0.541	0.549	0.558
0.08	0.453	0.453	0.453	0.453	0.454	0.454	0.454	0.455	0.459	0.466	0.474	0.482	0.492	0.502	0.513	0.522	0.531	0.541	0.549	0.558
0.09	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.471	0.472	0.475	0.48	0.487	0.495	0.504	0.514	0.522	0.531	0.541	0.549	0.558
0.1	0.484	0.484	0.484	0.484	0.484	0.484	0.484	0.485	0.485	0.486	0.489	0.494	0.5	0.508	0.517	0.524	0.532	0.541	0.549	0.558
0.11	0.498	0.498	0.498	0.498	0.498	0.498	0.498	0.498	0.499	0.499	0.501	0.503	0.507	0.514	0.521	0.528	0.535	0.543	0.55	0.558
0.12	0.512	0.512	0.512	0.512	0.512	0.512	0.512	0.512	0.513	0.513	0.513	0.515	0.517	0.521	0.527	0.533	0.539	0.546	0.553	0.560
0.13	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.527	0.527	0.527	0.528	0.529	0.532	0.536	0.54	0.545	0.551	0.558	0.564
0.14	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.54	0.54	0.54	0.54	0.541	0.541	0.542	0.545	0.548	0.552	0.558	0.563	0.569
0.15	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.552	0.552	0.552	0.552	0.552	0.553	0.554	0.557	0.56	0.564	0.568	0.573
0.16	0.563	0.563	0.563	0.563	0.563	0.563	0.563	0.563	0.563	0.563	0.563	0.564	0.564	0.564	0.565	0.567	0.569	0.572	0.576	0.580
0.17	0.574	0.574	0.574	0.574	0.574	0.574	0.574	0.574	0.574	0.574	0.574	0.575	0.575	0.575	0.576	0.576	0.578	0.58	0.583	0.587
0.18	0.585	0.585	0.585	0.585	0.585	0.585	0.585	0.585	0.585	0.585	0.585	0.586	0.586	0.586	0.587	0.587	0.588	0.59	0.591	0.594
0.19	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.596	0.596	0.596	0.597	0.597	0.598	0.6	0.602
0.2	0.605	0.605	0.605	0.605	0.605	0.605	0.605	0.605	0.605	0.605	0.605	0.605	0.605	0.606	0.606	0.606	0.607	0.607	0.608	0.610

Table E.12 Power Study: Sequential Test, $n = 50$ - H_0: Gamma(0.5,1); H_a: XLogistic(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.43	0.452	0.484	0.518	0.546	0.573	0.596	0.615	0.632	0.649	0.663	0.676	0.688	0.699	0.71	0.72	0.73	0.739	0.747	0.754
0.02	0.495	0.495	0.504	0.526	0.547	0.573	0.596	0.615	0.632	0.649	0.663	0.676	0.688	0.699	0.71	0.72	0.73	0.739	0.747	0.754
0.03	0.54	0.54	0.54	0.547	0.559	0.576	0.596	0.615	0.632	0.649	0.663	0.676	0.688	0.699	0.71	0.72	0.73	0.739	0.747	0.754
0.04	0.577	0.577	0.577	0.577	0.58	0.589	0.602	0.616	0.632	0.649	0.663	0.676	0.688	0.699	0.71	0.72	0.73	0.739	0.747	0.754
0.05	0.605	0.605	0.605	0.605	0.605	0.608	0.615	0.624	0.634	0.649	0.663	0.676	0.688	0.699	0.71	0.72	0.73	0.739	0.747	0.754
0.06	0.63	0.63	0.63	0.63	0.63	0.63	0.633	0.637	0.644	0.654	0.664	0.676	0.688	0.699	0.71	0.72	0.73	0.739	0.747	0.754
0.07	0.652	0.652	0.652	0.652	0.652	0.652	0.652	0.654	0.657	0.663	0.67	0.679	0.688	0.699	0.71	0.72	0.73	0.739	0.747	0.754
0.08	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.671	0.672	0.676	0.68	0.686	0.692	0.701	0.71	0.72	0.73	0.739	0.747	0.754
0.09	0.686	0.686	0.686	0.686	0.686	0.686	0.686	0.686	0.687	0.688	0.691	0.695	0.699	0.706	0.713	0.721	0.731	0.739	0.747	0.754
0.1	0.701	0.701	0.701	0.701	0.701	0.701	0.701	0.701	0.701	0.702	0.703	0.705	0.709	0.713	0.719	0.725	0.733	0.74	0.747	0.754
0.11	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.716	0.717	0.719	0.722	0.726	0.731	0.736	0.743	0.749	0.755
0.12	0.729	0.729	0.729	0.729	0.729	0.729	0.73	0.73	0.73	0.73	0.73	0.73	0.731	0.733	0.736	0.739	0.743	0.747	0.752	0.757
0.13	0.741	0.741	0.741	0.741	0.741	0.741	0.741	0.741	0.741	0.742	0.742	0.742	0.742	0.743	0.745	0.747	0.75	0.753	0.757	0.761
0.14	0.751	0.751	0.751	0.751	0.751	0.751	0.751	0.751	0.751	0.751	0.751	0.752	0.752	0.752	0.753	0.755	0.757	0.759	0.762	0.765
0.15	0.761	0.761	0.761	0.761	0.761	0.761	0.761	0.761	0.761	0.761	0.761	0.761	0.761	0.762	0.762	0.763	0.765	0.766	0.768	0.771
0.16	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.77	0.77	0.77	0.771	0.772	0.773	0.774	0.776
0.17	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.779	0.779	0.78	0.781	0.783
0.18	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.786	0.787	0.788	0.788	0.789
0.19	0.794	0.794	0.794	0.794	0.794	0.794	0.794	0.794	0.794	0.794	0.794	0.794	0.794	0.794	0.794	0.795	0.795	0.795	0.796	0.797
0.2	0.801	0.801	0.801	0.801	0.801	0.801	0.801	0.801	0.801	0.801	0.801	0.801	0.802	0.802	0.802	0.802	0.802	0.802	0.803	0.803

Table E.13 Power Study: Sequential Test, $n = 5$ - H_0: Gamma(0.5,1); H_a: XCauchy(0,1)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.279	0.305	0.323	0.337	0.353	0.364	0.375	0.384	0.393	0.402	0.412	0.42	0.429	0.437	0.446	0.454	0.461	0.469	0.476	0.484
	0.02	0.307	0.31	0.327	0.342	0.357	0.369	0.379	0.389	0.398	0.407	0.417	0.425	0.433	0.442	0.451	0.458	0.466	0.474	0.481	0.489
	0.03	0.327	0.33	0.332	0.346	0.362	0.373	0.384	0.393	0.402	0.412	0.421	0.429	0.438	0.447	0.455	0.463	0.471	0.478	0.486	0.493
	0.04	0.342	0.345	0.347	0.35	0.365	0.377	0.387	0.397	0.406	0.415	0.425	0.433	0.441	0.45	0.459	0.467	0.474	0.482	0.489	0.497
	0.05	0.36	0.362	0.365	0.368	0.37	0.381	0.392	0.401	0.41	0.42	0.429	0.437	0.446	0.455	0.463	0.471	0.479	0.486	0.494	0.501
	0.06	0.372	0.375	0.377	0.38	0.382	0.385	0.395	0.404	0.413	0.422	0.432	0.44	0.448	0.457	0.466	0.474	0.481	0.489	0.496	0.504
	0.07	0.383	0.386	0.388	0.39	0.392	0.395	0.397	0.406	0.415	0.424	0.434	0.442	0.45	0.459	0.468	0.475	0.483	0.49	0.498	0.505
	0.08	0.395	0.397	0.399	0.401	0.403	0.405	0.407	0.41	0.417	0.426	0.436	0.444	0.453	0.461	0.47	0.478	0.485	0.492	0.5	0.507
	0.09	0.405	0.407	0.409	0.411	0.413	0.414	0.416	0.418	0.421	0.428	0.438	0.446	0.455	0.463	0.472	0.479	0.487	0.494	0.502	0.509
	0.1	0.415	0.417	0.419	0.421	0.422	0.424	0.426	0.428	0.43	0.432	0.441	0.449	0.457	0.466	0.474	0.482	0.489	0.497	0.504	0.511
	0.11	0.425	0.427	0.428	0.431	0.432	0.434	0.436	0.438	0.439	0.441	0.444	0.451	0.46	0.468	0.477	0.484	0.492	0.499	0.506	0.514
	0.12	0.434	0.436	0.438	0.44	0.442	0.444	0.445	0.447	0.449	0.451	0.453	0.456	0.463	0.471	0.479	0.487	0.494	0.501	0.509	0.516
	0.13	0.443	0.445	0.447	0.449	0.451	0.452	0.454	0.456	0.457	0.459	0.461	0.464	0.467	0.474	0.482	0.49	0.497	0.504	0.511	0.518
	0.14	0.451	0.453	0.455	0.457	0.459	0.461	0.462	0.464	0.466	0.467	0.47	0.472	0.474	0.478	0.485	0.492	0.499	0.506	0.514	0.521
	0.15	0.461	0.463	0.465	0.467	0.469	0.47	0.472	0.474	0.475	0.477	0.479	0.481	0.483	0.486	0.489	0.495	0.502	0.509	0.517	0.524
	0.16	0.469	0.471	0.473	0.476	0.477	0.479	0.48	0.482	0.484	0.486	0.488	0.49	0.492	0.494	0.496	0.5	0.505	0.512	0.519	0.526
	0.17	0.477	0.479	0.481	0.483	0.485	0.487	0.488	0.49	0.492	0.493	0.495	0.497	0.499	0.502	0.504	0.506	0.509	0.515	0.522	0.529
	0.18	0.486	0.488	0.49	0.492	0.494	0.495	0.497	0.499	0.5	0.502	0.504	0.506	0.508	0.51	0.512	0.514	0.516	0.519	0.524	0.531
	0.19	0.494	0.496	0.498	0.5	0.502	0.504	0.505	0.507	0.509	0.51	0.512	0.514	0.516	0.519	0.521	0.523	0.524	0.527	0.529	0.534
	0.2	0.502	0.504	0.506	0.508	0.51	0.512	0.513	0.515	0.517	0.518	0.52	0.522	0.524	0.526	0.528	0.53	0.532	0.534	0.536	0.539

Table E.14 Power Study: Sequential Test, $n = 15$ - H_0: Gamma(0.5,1); H_a: XCauchy(0,1)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.633	0.651	0.667	0.677	0.687	0.695	0.703	0.71	0.717	0.722	0.727	0.733	0.738	0.743	0.747	0.751	0.755	0.76	0.764	0.767
	0.02	0.656	0.657	0.668	0.678	0.688	0.696	0.704	0.711	0.717	0.723	0.728	0.733	0.738	0.743	0.747	0.751	0.755	0.76	0.764	0.768
	0.03	0.672	0.672	0.673	0.678	0.689	0.697	0.705	0.711	0.718	0.723	0.728	0.734	0.739	0.743	0.748	0.752	0.756	0.76	0.764	0.768
	0.04	0.683	0.683	0.683	0.684	0.69	0.697	0.705	0.712	0.718	0.724	0.729	0.734	0.739	0.744	0.748	0.752	0.756	0.761	0.764	0.768
	0.05	0.694	0.694	0.694	0.694	0.695	0.699	0.706	0.712	0.718	0.724	0.729	0.735	0.739	0.744	0.748	0.752	0.756	0.761	0.764	0.768
	0.06	0.703	0.703	0.703	0.704	0.704	0.705	0.708	0.713	0.719	0.725	0.729	0.735	0.739	0.744	0.748	0.752	0.756	0.761	0.764	0.768
	0.07	0.712	0.712	0.712	0.712	0.712	0.713	0.714	0.716	0.72	0.725	0.73	0.735	0.74	0.744	0.749	0.753	0.757	0.761	0.765	0.768
	0.08	0.718	0.718	0.718	0.718	0.719	0.719	0.719	0.72	0.722	0.726	0.73	0.736	0.74	0.745	0.749	0.753	0.757	0.761	0.765	0.769
	0.09	0.725	0.725	0.725	0.725	0.725	0.725	0.725	0.726	0.727	0.729	0.732	0.736	0.741	0.745	0.749	0.753	0.757	0.762	0.765	0.769
	0.1	0.732	0.732	0.732	0.732	0.732	0.732	0.732	0.732	0.733	0.733	0.735	0.738	0.742	0.746	0.75	0.754	0.758	0.762	0.766	0.769
	0.11	0.737	0.737	0.738	0.738	0.738	0.738	0.738	0.738	0.738	0.738	0.74	0.741	0.744	0.747	0.75	0.754	0.758	0.762	0.766	0.769
	0.12	0.744	0.744	0.744	0.744	0.744	0.744	0.744	0.744	0.744	0.744	0.745	0.745	0.747	0.749	0.752	0.755	0.758	0.763	0.766	0.770
	0.13	0.749	0.749	0.749	0.749	0.749	0.749	0.749	0.749	0.75	0.75	0.75	0.75	0.751	0.753	0.755	0.757	0.759	0.763	0.766	0.770
	0.14	0.754	0.754	0.754	0.754	0.754	0.754	0.754	0.754	0.755	0.755	0.755	0.755	0.756	0.756	0.758	0.759	0.761	0.764	0.767	0.770
	0.15	0.759	0.759	0.759	0.759	0.759	0.759	0.759	0.759	0.759	0.759	0.76	0.76	0.76	0.76	0.762	0.762	0.764	0.767	0.769	0.771
	0.16	0.764	0.764	0.764	0.764	0.764	0.764	0.764	0.764	0.764	0.764	0.764	0.765	0.765	0.765	0.766	0.766	0.767	0.769	0.771	0.773
	0.17	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.769	0.77	0.77	0.77	0.771	0.772	0.774	0.776
	0.18	0.773	0.773	0.773	0.773	0.773	0.773	0.773	0.773	0.773	0.773	0.773	0.773	0.773	0.774	0.774	0.774	0.774	0.775	0.777	0.778
	0.19	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.778	0.778	0.778	0.778	0.778	0.778	0.779	0.78	0.781
	0.2	0.781	0.781	0.781	0.781	0.781	0.781	0.781	0.781	0.781	0.781	0.781	0.781	0.781	0.781	0.782	0.782	0.782	0.782	0.783	0.784

Table E.15 Power Study: Sequential Test, $n = 25$ - H_0: Gamma(0.5,1); H_a: XCauchy(0,1)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.761	0.773	0.785	0.795	0.803	0.81	0.816	0.821	0.825	0.83	0.834	0.839	0.843	0.846	0.85	0.854	0.857	0.861	0.865	0.868
	0.02	0.78	0.78	0.785	0.795	0.803	0.81	0.816	0.821	0.825	0.83	0.834	0.839	0.843	0.846	0.85	0.854	0.857	0.861	0.865	0.868
	0.03	0.795	0.795	0.795	0.798	0.803	0.81	0.816	0.821	0.825	0.83	0.834	0.839	0.843	0.846	0.85	0.854	0.857	0.861	0.865	0.868
	0.04	0.805	0.805	0.805	0.805	0.807	0.811	0.816	0.821	0.825	0.83	0.834	0.839	0.843	0.846	0.85	0.854	0.857	0.861	0.865	0.868
	0.05	0.815	0.815	0.815	0.815	0.815	0.817	0.819	0.822	0.825	0.83	0.834	0.839	0.843	0.846	0.85	0.854	0.858	0.861	0.865	0.868
	0.06	0.823	0.823	0.823	0.823	0.823	0.824	0.824	0.826	0.828	0.831	0.834	0.839	0.843	0.846	0.85	0.854	0.858	0.861	0.865	0.868
	0.07	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.831	0.832	0.834	0.837	0.839	0.843	0.846	0.85	0.854	0.858	0.861	0.865	0.868
	0.08	0.836	0.836	0.836	0.836	0.836	0.836	0.836	0.837	0.837	0.838	0.84	0.842	0.844	0.847	0.85	0.854	0.858	0.861	0.865	0.868
	0.09	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.845	0.846	0.847	0.848	0.85	0.852	0.855	0.858	0.861	0.865	0.868
	0.1	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.851	0.851	0.852	0.853	0.854	0.856	0.858	0.86	0.862	0.865	0.868
	0.11	0.857	0.857	0.857	0.857	0.857	0.857	0.857	0.857	0.857	0.857	0.858	0.858	0.859	0.86	0.861	0.862	0.864	0.866	0.868	0.870
	0.12	0.864	0.864	0.864	0.864	0.864	0.864	0.864	0.864	0.864	0.865	0.865	0.865	0.865	0.866	0.867	0.867	0.869	0.87	0.872	0.874
	0.13	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.875	0.876	0.877	0.878	0.879	0.881
	0.14	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.88	0.88	0.881	0.882	0.883	0.884
	0.15	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.884	0.885	0.886	0.887
	0.16	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.887	0.887	0.887	0.888	0.889	0.889
	0.17	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.891	0.891	0.892
	0.18	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.892	0.893	0.893	0.893	0.893	0.894	0.894
	0.19	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.896
	0.2	0.897	0.897	0.897	0.897	0.897	0.897	0.897	0.897	0.897	0.897	0.897	0.897	0.897	0.897	0.897	0.897	0.898	0.898	0.898	0.898

Table E.16 Power Study: Sequential Test, $n = 50$ - H_0: Gamma(0.5,1); H_a: XCauchy(0,1)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.877	0.878	0.883	0.893	0.904	0.908	0.911	0.913	0.915	0.917	0.918	0.919	0.92	0.921	0.922	0.923	0.924	0.925	0.926	0.926
	0.02	0.9	0.9	0.901	0.902	0.904	0.908	0.911	0.913	0.915	0.917	0.918	0.919	0.92	0.921	0.922	0.923	0.924	0.925	0.926	0.926
	0.03	0.907	0.907	0.907	0.907	0.908	0.909	0.911	0.913	0.915	0.917	0.918	0.919	0.92	0.921	0.922	0.923	0.924	0.925	0.926	0.926
	0.04	0.912	0.912	0.912	0.912	0.912	0.912	0.913	0.914	0.915	0.917	0.918	0.919	0.92	0.921	0.922	0.923	0.924	0.925	0.926	0.926
	0.05	0.915	0.915	0.915	0.915	0.915	0.915	0.915	0.915	0.916	0.917	0.918	0.919	0.92	0.921	0.922	0.923	0.924	0.925	0.926	0.926
	0.06	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.918	0.919	0.919	0.92	0.921	0.922	0.923	0.924	0.925	0.926	0.926
	0.07	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.921	0.922	0.922	0.923	0.924	0.925	0.926	0.926
	0.08	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.922	0.922	0.922	0.922	0.923	0.924	0.924	0.925	0.926	0.926
	0.09	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.924	0.924	0.925	0.925	0.926	0.926
	0.1	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.925	0.925	0.925	0.926	0.926	0.926
	0.11	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.926	0.926	0.926	0.926	0.927
	0.12	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.927	0.927
	0.13	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927
	0.14	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.928	0.928
	0.15	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928
	0.16	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928
	0.17	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.929	0.929	0.929	0.929	0.929	0.929	0.929
	0.18	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929
	0.19	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929
	0.2	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.930

E.2 H_0: Gamma (β = 1)

Table E.17 Power Study: Sequential Test, n = 5 - H_0 : Gamam(1,1); H_a: Beta(2,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.03	0.034	0.038	0.043	0.048	0.053	0.059	0.065	0.07	0.076	0.081	0.087	0.094	0.101	0.108	0.115	0.121	0.127	0.134	0.141
0.02	0.057	0.062	0.066	0.071	0.075	0.081	0.086	0.092	0.098	0.103	0.109	0.115	0.122	0.128	0.135	0.142	0.148	0.155	0.161	0.169
0.03	0.081	0.085	0.089	0.094	0.098	0.104	0.11	0.116	0.121	0.126	0.132	0.138	0.145	0.151	0.158	0.165	0.171	0.178	0.184	0.192
0.04	0.103	0.107	0.111	0.116	0.12	0.126	0.131	0.137	0.142	0.148	0.153	0.16	0.167	0.173	0.18	0.187	0.193	0.199	0.206	0.213
0.05	0.123	0.127	0.131	0.136	0.14	0.145	0.151	0.157	0.162	0.168	0.173	0.179	0.186	0.193	0.2	0.207	0.213	0.219	0.226	0.233
0.06	0.143	0.147	0.151	0.156	0.16	0.165	0.171	0.177	0.182	0.188	0.193	0.199	0.206	0.212	0.219	0.226	0.232	0.239	0.245	0.253
0.07	0.162	0.166	0.17	0.175	0.179	0.184	0.189	0.195	0.2	0.206	0.211	0.217	0.224	0.231	0.238	0.245	0.251	0.257	0.264	0.271
0.08	0.181	0.185	0.189	0.194	0.198	0.203	0.208	0.213	0.219	0.224	0.23	0.236	0.243	0.249	0.256	0.263	0.269	0.275	0.282	0.289
0.09	0.198	0.203	0.207	0.211	0.215	0.221	0.226	0.231	0.236	0.241	0.247	0.253	0.26	0.266	0.273	0.28	0.286	0.293	0.299	0.306
0.1	0.214	0.218	0.222	0.227	0.231	0.236	0.241	0.247	0.251	0.256	0.262	0.268	0.275	0.281	0.288	0.295	0.301	0.308	0.314	0.321
0.11	0.23	0.234	0.238	0.242	0.246	0.252	0.257	0.262	0.267	0.272	0.277	0.283	0.29	0.296	0.303	0.31	0.316	0.322	0.328	0.335
0.12	0.245	0.249	0.253	0.258	0.262	0.267	0.271	0.277	0.281	0.286	0.291	0.297	0.304	0.309	0.316	0.323	0.329	0.335	0.341	0.348
0.13	0.257	0.261	0.264	0.268	0.272	0.277	0.282	0.287	0.292	0.296	0.301	0.306	0.313	0.318	0.325	0.332	0.337	0.343	0.35	0.356
0.14	0.268	0.271	0.275	0.279	0.282	0.287	0.291	0.297	0.301	0.306	0.311	0.316	0.322	0.327	0.334	0.34	0.346	0.351	0.358	0.364
0.15	0.281	0.284	0.287	0.29	0.294	0.298	0.303	0.307	0.312	0.316	0.321	0.326	0.332	0.338	0.343	0.35	0.355	0.361	0.367	0.374
0.16	0.295	0.297	0.299	0.302	0.306	0.31	0.314	0.319	0.323	0.327	0.332	0.337	0.343	0.348	0.353	0.359	0.364	0.37	0.376	0.383
0.17	0.307	0.309	0.311	0.314	0.317	0.321	0.325	0.329	0.333	0.338	0.342	0.347	0.353	0.357	0.363	0.368	0.373	0.379	0.385	0.391
0.18	0.319	0.322	0.324	0.326	0.329	0.332	0.336	0.34	0.344	0.348	0.353	0.357	0.363	0.367	0.373	0.378	0.383	0.388	0.393	0.400
0.19	0.331	0.334	0.336	0.338	0.34	0.344	0.347	0.351	0.355	0.359	0.363	0.367	0.373	0.377	0.382	0.388	0.392	0.397	0.402	0.408
0.2	0.343	0.346	0.348	0.35	0.352	0.355	0.358	0.362	0.366	0.37	0.374	0.378	0.383	0.388	0.392	0.397	0.402	0.407	0.412	0.417

Table E.18 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a: Beta(2,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.369	0.381	0.394	0.406	0.421	0.435	0.45	0.466	0.478	0.492	0.506	0.52	0.534	0.546	0.559	0.569	0.581	0.593	0.605	0.618
0.02	0.472	0.481	0.491	0.5	0.511	0.522	0.534	0.546	0.556	0.567	0.577	0.589	0.6	0.609	0.62	0.629	0.638	0.647	0.657	0.667
0.03	0.543	0.55	0.557	0.564	0.573	0.582	0.591	0.601	0.608	0.617	0.625	0.635	0.644	0.652	0.661	0.668	0.676	0.684	0.692	0.701
0.04	0.592	0.597	0.602	0.608	0.615	0.622	0.63	0.638	0.645	0.652	0.659	0.668	0.675	0.682	0.689	0.696	0.702	0.709	0.716	0.725
0.05	0.633	0.637	0.641	0.646	0.651	0.657	0.663	0.67	0.676	0.682	0.688	0.695	0.702	0.708	0.714	0.72	0.726	0.731	0.738	0.745
0.06	0.665	0.668	0.671	0.675	0.679	0.683	0.689	0.695	0.699	0.705	0.71	0.716	0.722	0.727	0.733	0.738	0.743	0.748	0.754	0.760
0.07	0.694	0.697	0.699	0.702	0.705	0.709	0.713	0.718	0.722	0.727	0.732	0.737	0.742	0.746	0.751	0.755	0.76	0.765	0.77	0.775
0.08	0.721	0.723	0.725	0.727	0.73	0.733	0.737	0.741	0.744	0.748	0.752	0.756	0.76	0.764	0.768	0.772	0.776	0.78	0.784	0.789
0.09	0.743	0.745	0.746	0.748	0.75	0.753	0.756	0.759	0.762	0.765	0.769	0.773	0.776	0.779	0.783	0.786	0.79	0.793	0.797	0.801
0.1	0.76	0.762	0.763	0.764	0.766	0.768	0.771	0.774	0.776	0.779	0.782	0.785	0.789	0.791	0.794	0.797	0.801	0.804	0.807	0.811
0.11	0.777	0.778	0.779	0.78	0.782	0.783	0.786	0.788	0.79	0.793	0.795	0.798	0.801	0.803	0.806	0.809	0.812	0.815	0.817	0.821
0.12	0.791	0.792	0.793	0.794	0.795	0.797	0.799	0.801	0.802	0.805	0.807	0.809	0.812	0.814	0.816	0.818	0.821	0.824	0.826	0.830
0.13	0.805	0.805	0.806	0.807	0.808	0.809	0.811	0.812	0.814	0.816	0.818	0.82	0.822	0.824	0.826	0.828	0.83	0.833	0.835	0.838
0.14	0.817	0.818	0.818	0.819	0.82	0.821	0.822	0.823	0.825	0.826	0.828	0.83	0.832	0.833	0.835	0.836	0.839	0.841	0.843	0.846
0.15	0.827	0.828	0.828	0.829	0.829	0.83	0.832	0.833	0.834	0.835	0.837	0.838	0.84	0.841	0.843	0.844	0.846	0.848	0.85	0.853
0.16	0.838	0.838	0.839	0.839	0.839	0.84	0.842	0.842	0.843	0.844	0.846	0.847	0.849	0.85	0.851	0.853	0.854	0.856	0.858	0.860
0.17	0.848	0.848	0.848	0.848	0.849	0.849	0.85	0.851	0.852	0.853	0.854	0.855	0.857	0.858	0.859	0.86	0.861	0.863	0.865	0.867
0.18	0.857	0.857	0.857	0.857	0.857	0.858	0.859	0.859	0.86	0.861	0.862	0.863	0.864	0.865	0.866	0.867	0.868	0.87	0.871	0.873
0.19	0.865	0.865	0.865	0.865	0.865	0.866	0.866	0.867	0.868	0.868	0.869	0.87	0.871	0.872	0.873	0.874	0.875	0.876	0.877	0.878
0.2	0.872	0.872	0.872	0.872	0.872	0.873	0.873	0.874	0.874	0.875	0.876	0.876	0.877	0.878	0.879	0.879	0.88	0.881	0.882	0.884

Table E.19 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a: Beta(2,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.749	0.759	0.77	0.78	0.791	0.8	0.811	0.822	0.832	0.842	0.851	0.859	0.867	0.875	0.883	0.89	0.895	0.901	0.907	0.913
0.02	0.835	0.839	0.844	0.849	0.855	0.86	0.866	0.872	0.878	0.884	0.89	0.894	0.899	0.904	0.909	0.914	0.918	0.922	0.927	0.931
0.03	0.872	0.875	0.878	0.881	0.885	0.888	0.892	0.896	0.9	0.905	0.909	0.912	0.916	0.919	0.923	0.927	0.93	0.933	0.937	0.940
0.04	0.899	0.9	0.902	0.904	0.906	0.908	0.911	0.914	0.917	0.92	0.923	0.926	0.929	0.931	0.934	0.937	0.94	0.942	0.945	0.948
0.05	0.92	0.92	0.921	0.922	0.924	0.925	0.927	0.929	0.931	0.933	0.935	0.937	0.939	0.941	0.944	0.946	0.948	0.95	0.952	0.954
0.06	0.934	0.934	0.935	0.935	0.936	0.937	0.939	0.94	0.942	0.943	0.945	0.946	0.948	0.949	0.951	0.953	0.955	0.956	0.958	0.960
0.07	0.945	0.945	0.946	0.946	0.947	0.947	0.948	0.949	0.95	0.951	0.953	0.954	0.955	0.956	0.957	0.959	0.96	0.961	0.963	0.964
0.08	0.954	0.954	0.954	0.954	0.954	0.955	0.955	0.956	0.957	0.958	0.958	0.959	0.96	0.961	0.962	0.963	0.964	0.965	0.967	0.968
0.09	0.959	0.959	0.959	0.96	0.96	0.96	0.96	0.961	0.962	0.962	0.963	0.964	0.964	0.965	0.966	0.967	0.968	0.968	0.97	0.971
0.1	0.964	0.964	0.965	0.965	0.965	0.965	0.965	0.966	0.966	0.967	0.967	0.968	0.968	0.969	0.969	0.97	0.971	0.971	0.972	0.973
0.11	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.97	0.97	0.97	0.971	0.971	0.971	0.972	0.972	0.973	0.974	0.974	0.975	0.976
0.12	0.972	0.972	0.972	0.972	0.973	0.973	0.973	0.973	0.973	0.973	0.974	0.974	0.974	0.975	0.975	0.976	0.976	0.976	0.977	0.978
0.13	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.977	0.977	0.977	0.977	0.978	0.978	0.979	0.979	0.98	0.980
0.14	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.979	0.979	0.979	0.979	0.979	0.98	0.98	0.98	0.98	0.981	0.981	0.982
0.15	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.981	0.981	0.981	0.981	0.981	0.982	0.982	0.982	0.982	0.983
0.16	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.983	0.983	0.983	0.983	0.983	0.984	0.984
0.17	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.985	0.985
0.18	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.986	0.986	0.986	0.986
0.19	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987
0.2	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.989

Table E.20 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a: Beta(2,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.997	0.997	0.997	0.997	0.998	0.998	0.998	0.999	0.999	0.999	0.999	0.999	0.999	1	1	1	1	1	1	1.000
0.02	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1	1	1	1	1	1	1	1	1	1	1.000
0.03	0.999	0.999	0.999	0.999	0.999	0.999	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.04	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.05	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.06	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.07	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.08	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.09	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
0.2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000

Table E.21 Power Study: Sequential Test, n = 5 - H_0 : Gamam(1,1); H_a: Beta(2,3)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.023	0.027	0.031	0.035	0.041	0.047	0.053	0.059	0.064	0.069	0.076	0.082	0.088	0.094	0.102	0.109	0.115	0.122	0.129	0.136
	0.02	0.043	0.047	0.051	0.055	0.061	0.067	0.073	0.079	0.084	0.089	0.096	0.102	0.108	0.114	0.122	0.129	0.135	0.142	0.149	0.156
	0.03	0.059	0.062	0.066	0.071	0.076	0.082	0.088	0.094	0.099	0.104	0.111	0.117	0.124	0.13	0.137	0.144	0.15	0.158	0.165	0.171
	0.04	0.076	0.08	0.084	0.088	0.093	0.099	0.105	0.111	0.116	0.121	0.128	0.134	0.14	0.146	0.154	0.161	0.167	0.174	0.181	0.188
	0.05	0.092	0.096	0.1	0.104	0.109	0.114	0.12	0.126	0.131	0.137	0.144	0.15	0.156	0.162	0.17	0.176	0.183	0.19	0.197	0.204
	0.06	0.108	0.112	0.116	0.119	0.124	0.13	0.135	0.141	0.146	0.152	0.159	0.165	0.171	0.177	0.185	0.191	0.198	0.205	0.212	0.219
	0.07	0.122	0.126	0.13	0.134	0.138	0.144	0.149	0.155	0.16	0.165	0.172	0.178	0.184	0.19	0.198	0.205	0.211	0.219	0.225	0.232
	0.08	0.137	0.141	0.145	0.149	0.153	0.158	0.164	0.169	0.174	0.179	0.186	0.192	0.199	0.205	0.212	0.219	0.225	0.233	0.24	0.247
	0.09	0.153	0.156	0.16	0.164	0.169	0.174	0.179	0.185	0.189	0.195	0.202	0.208	0.214	0.22	0.228	0.234	0.241	0.248	0.255	0.262
	0.1	0.167	0.17	0.174	0.178	0.183	0.188	0.193	0.199	0.203	0.208	0.215	0.221	0.227	0.233	0.241	0.247	0.254	0.261	0.268	0.275
	0.11	0.18	0.183	0.187	0.191	0.196	0.201	0.206	0.211	0.216	0.221	0.227	0.233	0.239	0.245	0.253	0.259	0.265	0.273	0.28	0.286
	0.12	0.193	0.197	0.2	0.204	0.209	0.214	0.219	0.224	0.228	0.232	0.238	0.244	0.25	0.256	0.263	0.269	0.276	0.283	0.29	0.296
	0.13	0.204	0.207	0.211	0.214	0.219	0.223	0.228	0.233	0.238	0.242	0.248	0.253	0.259	0.264	0.271	0.278	0.284	0.291	0.298	0.304
	0.14	0.214	0.217	0.22	0.224	0.228	0.233	0.237	0.242	0.246	0.251	0.256	0.261	0.267	0.272	0.279	0.285	0.291	0.298	0.305	0.311
	0.15	0.225	0.228	0.231	0.234	0.238	0.242	0.247	0.251	0.255	0.26	0.265	0.27	0.275	0.28	0.287	0.293	0.299	0.306	0.312	0.318
	0.16	0.236	0.238	0.241	0.244	0.247	0.252	0.256	0.261	0.265	0.269	0.275	0.279	0.284	0.289	0.295	0.301	0.306	0.313	0.32	0.326
	0.17	0.248	0.25	0.253	0.255	0.259	0.263	0.267	0.271	0.275	0.279	0.285	0.289	0.294	0.299	0.305	0.31	0.316	0.322	0.328	0.334
	0.18	0.259	0.261	0.263	0.265	0.269	0.273	0.276	0.28	0.284	0.288	0.294	0.298	0.303	0.307	0.313	0.318	0.324	0.33	0.336	0.342
	0.19	0.271	0.273	0.275	0.277	0.28	0.284	0.287	0.291	0.295	0.299	0.304	0.308	0.313	0.317	0.323	0.328	0.333	0.339	0.344	0.350
	0.2	0.282	0.284	0.286	0.288	0.291	0.294	0.297	0.301	0.305	0.309	0.313	0.317	0.322	0.326	0.332	0.337	0.342	0.347	0.352	0.357

Table E.22 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a: Beta(2,3)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.193	0.203	0.214	0.226	0.238	0.251	0.264	0.276	0.288	0.302	0.315	0.328	0.341	0.352	0.366	0.378	0.39	0.403	0.414	0.428
	0.02	0.268	0.276	0.285	0.294	0.304	0.315	0.326	0.336	0.346	0.358	0.369	0.38	0.392	0.401	0.412	0.424	0.433	0.445	0.455	0.466
	0.03	0.327	0.333	0.34	0.347	0.355	0.364	0.373	0.382	0.391	0.401	0.41	0.42	0.429	0.437	0.448	0.457	0.466	0.476	0.485	0.496
	0.04	0.369	0.374	0.38	0.386	0.393	0.401	0.408	0.416	0.423	0.432	0.44	0.449	0.457	0.465	0.473	0.482	0.49	0.499	0.507	0.517
	0.05	0.408	0.412	0.417	0.422	0.428	0.434	0.441	0.448	0.454	0.462	0.468	0.476	0.483	0.49	0.498	0.505	0.512	0.52	0.528	0.536
	0.06	0.44	0.443	0.447	0.451	0.456	0.462	0.468	0.474	0.479	0.486	0.492	0.498	0.505	0.51	0.517	0.524	0.531	0.538	0.545	0.553
	0.07	0.471	0.474	0.477	0.481	0.485	0.49	0.495	0.5	0.504	0.51	0.516	0.521	0.527	0.532	0.538	0.545	0.55	0.557	0.563	0.570
	0.08	0.5	0.503	0.505	0.508	0.511	0.515	0.52	0.524	0.528	0.533	0.538	0.543	0.548	0.552	0.558	0.564	0.569	0.575	0.581	0.587
	0.09	0.527	0.529	0.531	0.534	0.536	0.54	0.543	0.547	0.55	0.554	0.558	0.563	0.567	0.571	0.576	0.581	0.586	0.592	0.597	0.603
	0.1	0.549	0.551	0.552	0.554	0.557	0.56	0.563	0.566	0.569	0.573	0.576	0.58	0.584	0.588	0.592	0.597	0.601	0.606	0.611	0.616
	0.11	0.57	0.571	0.572	0.574	0.576	0.578	0.581	0.584	0.587	0.59	0.593	0.596	0.6	0.603	0.607	0.611	0.615	0.62	0.624	0.629
	0.12	0.588	0.589	0.59	0.591	0.593	0.595	0.597	0.6	0.602	0.605	0.608	0.611	0.614	0.617	0.621	0.624	0.628	0.632	0.636	0.640
	0.13	0.607	0.608	0.609	0.609	0.611	0.613	0.614	0.616	0.619	0.621	0.623	0.626	0.629	0.632	0.635	0.638	0.641	0.645	0.648	0.653
	0.14	0.624	0.624	0.625	0.626	0.627	0.628	0.63	0.631	0.633	0.635	0.637	0.64	0.642	0.645	0.647	0.651	0.653	0.657	0.66	0.664
	0.15	0.639	0.639	0.639	0.64	0.641	0.642	0.643	0.645	0.646	0.648	0.65	0.652	0.654	0.656	0.659	0.662	0.664	0.667	0.67	0.674
	0.16	0.655	0.656	0.656	0.657	0.657	0.658	0.659	0.66	0.662	0.663	0.665	0.667	0.669	0.67	0.673	0.676	0.678	0.681	0.683	0.686
	0.17	0.669	0.669	0.67	0.67	0.67	0.671	0.672	0.673	0.675	0.676	0.677	0.679	0.681	0.682	0.684	0.687	0.689	0.691	0.694	0.696
	0.18	0.682	0.682	0.683	0.683	0.683	0.684	0.685	0.686	0.687	0.688	0.689	0.69	0.692	0.693	0.695	0.697	0.699	0.702	0.704	0.706
	0.19	0.695	0.695	0.695	0.695	0.696	0.696	0.697	0.698	0.699	0.7	0.701	0.702	0.703	0.704	0.706	0.708	0.71	0.712	0.714	0.716
	0.2	0.707	0.707	0.707	0.707	0.708	0.708	0.709	0.709	0.71	0.711	0.712	0.713	0.714	0.715	0.716	0.718	0.719	0.721	0.723	0.725

Table E.23 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a: Beta(2,3)

Skewness Test Significance Level (α) \ Kurtosis Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.436	0.447	0.46	0.473	0.489	0.503	0.522	0.537	0.553	0.572	0.588	0.603	0.618	0.633	0.647	0.661	0.674	0.685	0.699	0.712
0.02	0.551	0.556	0.563	0.57	0.579	0.588	0.6	0.61	0.621	0.633	0.645	0.656	0.667	0.679	0.689	0.701	0.71	0.719	0.73	0.741
0.03	0.611	0.614	0.619	0.623	0.629	0.636	0.645	0.652	0.66	0.67	0.679	0.688	0.697	0.706	0.715	0.724	0.732	0.74	0.75	0.759
0.04	0.663	0.664	0.667	0.67	0.674	0.679	0.685	0.69	0.697	0.704	0.711	0.718	0.724	0.732	0.739	0.747	0.754	0.761	0.769	0.776
0.05	0.706	0.707	0.709	0.71	0.714	0.717	0.721	0.725	0.729	0.735	0.74	0.745	0.751	0.757	0.762	0.769	0.775	0.78	0.787	0.793
0.06	0.74	0.74	0.741	0.742	0.744	0.747	0.75	0.753	0.755	0.76	0.764	0.768	0.772	0.777	0.781	0.787	0.792	0.796	0.802	0.808
0.07	0.768	0.768	0.768	0.769	0.77	0.772	0.774	0.776	0.778	0.782	0.785	0.788	0.791	0.795	0.798	0.803	0.807	0.811	0.815	0.820
0.08	0.79	0.79	0.79	0.791	0.792	0.793	0.795	0.796	0.798	0.801	0.803	0.805	0.808	0.811	0.814	0.818	0.821	0.824	0.828	0.832
0.09	0.808	0.808	0.808	0.808	0.809	0.81	0.811	0.813	0.814	0.816	0.818	0.82	0.822	0.824	0.827	0.83	0.833	0.836	0.839	0.843
0.1	0.824	0.824	0.824	0.824	0.825	0.826	0.827	0.828	0.828	0.83	0.831	0.833	0.835	0.837	0.839	0.842	0.844	0.846	0.849	0.853
0.11	0.839	0.839	0.839	0.839	0.839	0.84	0.84	0.841	0.842	0.843	0.844	0.845	0.847	0.848	0.85	0.853	0.855	0.857	0.859	0.862
0.12	0.851	0.851	0.851	0.851	0.852	0.852	0.852	0.853	0.854	0.854	0.855	0.856	0.857	0.859	0.86	0.862	0.864	0.866	0.868	0.870
0.13	0.864	0.864	0.864	0.864	0.864	0.864	0.864	0.865	0.865	0.866	0.866	0.867	0.868	0.869	0.87	0.872	0.873	0.875	0.877	0.878
0.14	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.874	0.874	0.875	0.875	0.876	0.877	0.878	0.879	0.88	0.882	0.883	0.885
0.15	0.881	0.881	0.881	0.881	0.881	0.881	0.881	0.882	0.882	0.882	0.883	0.883	0.884	0.884	0.885	0.887	0.887	0.889	0.89	0.891
0.16	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.89	0.89	0.891	0.891	0.892	0.893	0.893	0.895	0.896	0.897
0.17	0.895	0.895	0.895	0.895	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.897	0.897	0.897	0.898	0.899	0.899	0.9	0.901	0.902
0.18	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.903	0.903	0.903	0.904	0.904	0.905	0.906	0.906	0.907
0.19	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.909	0.909	0.909	0.91	0.91	0.911	0.912	0.912
0.2	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.915	0.915	0.915	0.915	0.916	0.916	0.917	0.917

Table E.24 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a: Beta(2,3)

Skewness Test Significance Level (α) \ Kurtosis Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.91	0.913	0.917	0.921	0.926	0.931	0.936	0.941	0.945	0.949	0.953	0.957	0.96	0.964	0.967	0.969	0.971	0.974	0.976	0.978
0.02	0.949	0.949	0.95	0.952	0.953	0.955	0.957	0.96	0.962	0.963	0.966	0.968	0.97	0.972	0.974	0.975	0.977	0.979	0.98	0.982
0.03	0.965	0.965	0.966	0.966	0.967	0.968	0.969	0.97	0.971	0.972	0.973	0.975	0.976	0.977	0.979	0.98	0.981	0.982	0.984	0.985
0.04	0.975	0.975	0.976	0.976	0.976	0.976	0.977	0.977	0.978	0.978	0.979	0.98	0.981	0.982	0.983	0.983	0.984	0.985	0.986	0.987
0.05	0.981	0.981	0.981	0.982	0.982	0.982	0.982	0.982	0.983	0.983	0.983	0.984	0.984	0.985	0.986	0.986	0.987	0.988	0.988	0.989
0.06	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.987	0.987	0.987	0.988	0.988	0.989	0.989	0.99	0.99	0.991
0.07	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.989	0.989	0.989	0.989	0.99	0.99	0.99	0.991	0.991	0.991	0.992
0.08	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.991	0.991	0.991	0.991	0.992	0.992	0.992	0.992	0.992	0.993
0.09	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.993	0.993	0.993	0.993	0.993	0.994	0.994
0.1	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.994	0.994	0.994	0.994	0.994	0.994	0.994
0.11	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
0.12	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
0.13	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.997	0.997
0.14	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
0.15	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.998	0.998	0.998
0.16	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
0.17	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
0.18	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
0.19	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
0.2	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998

Table E.25 Power Study: Sequential Test, n = 5 - H_0 : Gamma(1,1); H_a: Weibull(1,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.018	0.023	0.027	0.031	0.036	0.042	0.047	0.052	0.058	0.064	0.07	0.076	0.082	0.089	0.096	0.102	0.109	0.115	0.122	0.129
0.02	0.035	0.039	0.044	0.048	0.053	0.058	0.064	0.069	0.075	0.08	0.087	0.093	0.099	0.105	0.112	0.119	0.125	0.132	0.139	0.146
0.03	0.05	0.055	0.058	0.062	0.067	0.073	0.078	0.083	0.089	0.095	0.101	0.107	0.113	0.12	0.127	0.133	0.14	0.146	0.153	0.160
0.04	0.065	0.069	0.072	0.076	0.081	0.086	0.091	0.097	0.103	0.108	0.114	0.121	0.126	0.133	0.14	0.147	0.153	0.16	0.167	0.173
0.05	0.079	0.083	0.087	0.09	0.095	0.1	0.105	0.11	0.116	0.122	0.128	0.134	0.14	0.147	0.154	0.16	0.167	0.173	0.18	0.187
0.06	0.093	0.098	0.101	0.105	0.109	0.113	0.118	0.124	0.13	0.135	0.141	0.147	0.153	0.16	0.167	0.174	0.18	0.187	0.194	0.200
0.07	0.107	0.111	0.115	0.118	0.122	0.126	0.131	0.136	0.142	0.147	0.154	0.16	0.166	0.172	0.179	0.186	0.192	0.199	0.206	0.213
0.08	0.12	0.124	0.128	0.132	0.136	0.14	0.144	0.149	0.155	0.16	0.166	0.172	0.178	0.185	0.192	0.199	0.205	0.212	0.219	0.225
0.09	0.134	0.138	0.142	0.145	0.149	0.153	0.158	0.162	0.167	0.172	0.179	0.185	0.191	0.197	0.204	0.211	0.217	0.224	0.231	0.238
0.1	0.148	0.152	0.156	0.159	0.163	0.167	0.172	0.176	0.181	0.185	0.191	0.197	0.203	0.209	0.216	0.223	0.229	0.236	0.243	0.249
0.11	0.16	0.164	0.168	0.171	0.175	0.18	0.184	0.188	0.193	0.197	0.202	0.208	0.213	0.22	0.227	0.234	0.24	0.246	0.253	0.260
0.12	0.171	0.175	0.178	0.182	0.185	0.19	0.194	0.198	0.203	0.206	0.211	0.216	0.222	0.228	0.235	0.242	0.248	0.254	0.261	0.268
0.13	0.181	0.184	0.188	0.191	0.195	0.199	0.203	0.207	0.211	0.215	0.22	0.225	0.229	0.236	0.242	0.249	0.255	0.261	0.268	0.274
0.14	0.191	0.195	0.198	0.201	0.204	0.208	0.212	0.216	0.221	0.224	0.229	0.233	0.238	0.243	0.249	0.256	0.262	0.268	0.275	0.281
0.15	0.202	0.205	0.208	0.211	0.214	0.218	0.222	0.226	0.23	0.233	0.238	0.242	0.246	0.251	0.257	0.263	0.269	0.275	0.282	0.288
0.16	0.214	0.216	0.219	0.221	0.224	0.228	0.232	0.235	0.239	0.243	0.247	0.252	0.256	0.26	0.266	0.271	0.276	0.282	0.289	0.295
0.17	0.225	0.228	0.23	0.232	0.235	0.238	0.242	0.245	0.249	0.253	0.257	0.261	0.265	0.269	0.275	0.279	0.284	0.29	0.296	0.302
0.18	0.235	0.238	0.24	0.242	0.244	0.247	0.251	0.254	0.258	0.261	0.265	0.27	0.274	0.278	0.283	0.287	0.292	0.297	0.303	0.309
0.19	0.245	0.248	0.25	0.252	0.254	0.257	0.26	0.264	0.267	0.271	0.275	0.279	0.282	0.286	0.291	0.295	0.3	0.304	0.31	0.316
0.2	0.255	0.257	0.259	0.261	0.264	0.266	0.269	0.273	0.276	0.279	0.283	0.287	0.291	0.295	0.299	0.303	0.307	0.312	0.318	0.323

Table E.26 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a: Weibull(1,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.117	0.123	0.13	0.137	0.146	0.154	0.163	0.172	0.181	0.191	0.2	0.21	0.22	0.229	0.24	0.249	0.259	0.269	0.279	0.289
0.02	0.168	0.173	0.178	0.184	0.191	0.199	0.206	0.214	0.221	0.23	0.238	0.247	0.256	0.264	0.273	0.281	0.29	0.298	0.307	0.316
0.03	0.209	0.213	0.218	0.222	0.228	0.235	0.24	0.248	0.254	0.262	0.269	0.277	0.284	0.291	0.3	0.307	0.315	0.323	0.331	0.339
0.04	0.24	0.243	0.247	0.25	0.255	0.261	0.266	0.272	0.278	0.285	0.292	0.299	0.305	0.312	0.32	0.326	0.333	0.341	0.348	0.356
0.05	0.27	0.272	0.275	0.278	0.283	0.287	0.292	0.297	0.303	0.309	0.315	0.321	0.327	0.333	0.34	0.346	0.352	0.359	0.365	0.372
0.06	0.295	0.297	0.299	0.302	0.305	0.309	0.313	0.318	0.323	0.328	0.334	0.339	0.344	0.35	0.356	0.362	0.367	0.374	0.38	0.386
0.07	0.319	0.321	0.323	0.325	0.328	0.332	0.335	0.339	0.343	0.348	0.353	0.358	0.363	0.367	0.373	0.378	0.383	0.389	0.395	0.401
0.08	0.344	0.345	0.346	0.348	0.351	0.354	0.357	0.36	0.364	0.368	0.372	0.376	0.381	0.385	0.39	0.395	0.4	0.405	0.411	0.416
0.09	0.365	0.365	0.367	0.369	0.371	0.373	0.376	0.379	0.382	0.386	0.389	0.393	0.397	0.401	0.406	0.41	0.415	0.42	0.425	0.430
0.1	0.383	0.384	0.385	0.387	0.388	0.391	0.393	0.396	0.398	0.401	0.405	0.408	0.412	0.415	0.419	0.424	0.428	0.433	0.437	0.442
0.11	0.401	0.402	0.403	0.404	0.405	0.407	0.409	0.412	0.414	0.417	0.42	0.423	0.426	0.429	0.433	0.437	0.441	0.445	0.449	0.454
0.12	0.417	0.418	0.419	0.42	0.421	0.423	0.424	0.427	0.429	0.431	0.433	0.436	0.439	0.442	0.446	0.449	0.453	0.456	0.46	0.465
0.13	0.434	0.434	0.435	0.436	0.437	0.438	0.439	0.441	0.443	0.445	0.448	0.45	0.453	0.455	0.459	0.462	0.465	0.468	0.472	0.476
0.14	0.449	0.449	0.45	0.45	0.451	0.453	0.454	0.455	0.457	0.459	0.461	0.463	0.465	0.468	0.471	0.474	0.476	0.48	0.483	0.487
0.15	0.463	0.463	0.463	0.464	0.465	0.466	0.467	0.468	0.47	0.471	0.473	0.475	0.477	0.479	0.481	0.484	0.487	0.49	0.493	0.496
0.16	0.477	0.477	0.478	0.478	0.479	0.48	0.481	0.482	0.483	0.484	0.486	0.487	0.489	0.491	0.494	0.496	0.498	0.501	0.504	0.507
0.17	0.491	0.491	0.492	0.492	0.492	0.493	0.494	0.495	0.496	0.497	0.499	0.5	0.502	0.503	0.505	0.508	0.51	0.512	0.515	0.518
0.18	0.505	0.505	0.505	0.506	0.506	0.507	0.507	0.508	0.509	0.51	0.511	0.512	0.514	0.515	0.517	0.519	0.521	0.524	0.526	0.528
0.19	0.519	0.519	0.519	0.519	0.519	0.52	0.52	0.521	0.522	0.523	0.524	0.525	0.526	0.527	0.529	0.531	0.533	0.535	0.537	0.540
0.2	0.53	0.53	0.53	0.53	0.53	0.53	0.531	0.531	0.532	0.533	0.534	0.535	0.536	0.537	0.538	0.54	0.542	0.544	0.546	0.548

Table E.27 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a: Weibull(1,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.23	0.236	0.243	0.252	0.262	0.272	0.283	0.295	0.307	0.321	0.333	0.346	0.359	0.372	0.384	0.395	0.406	0.419	0.432	0.445
0.02	0.315	0.318	0.322	0.327	0.333	0.34	0.347	0.355	0.363	0.373	0.382	0.391	0.401	0.412	0.421	0.431	0.44	0.45	0.461	0.471
0.03	0.362	0.363	0.366	0.369	0.374	0.379	0.384	0.391	0.397	0.405	0.412	0.42	0.428	0.437	0.445	0.453	0.461	0.47	0.48	0.489
0.04	0.406	0.407	0.409	0.411	0.414	0.417	0.421	0.426	0.431	0.437	0.443	0.449	0.456	0.463	0.47	0.477	0.484	0.492	0.5	0.508
0.05	0.447	0.448	0.449	0.45	0.452	0.454	0.457	0.461	0.464	0.469	0.474	0.479	0.485	0.49	0.495	0.502	0.507	0.514	0.521	0.528
0.06	0.479	0.479	0.479	0.48	0.482	0.483	0.486	0.488	0.491	0.495	0.499	0.503	0.507	0.512	0.517	0.521	0.527	0.532	0.539	0.545
0.07	0.507	0.507	0.507	0.508	0.509	0.51	0.512	0.513	0.516	0.519	0.522	0.525	0.529	0.533	0.537	0.541	0.546	0.55	0.556	0.561
0.08	0.533	0.533	0.533	0.533	0.534	0.535	0.536	0.537	0.539	0.541	0.544	0.547	0.55	0.553	0.556	0.56	0.563	0.568	0.573	0.577
0.09	0.553	0.553	0.553	0.553	0.554	0.554	0.555	0.556	0.558	0.559	0.562	0.564	0.566	0.569	0.572	0.575	0.578	0.581	0.586	0.590
0.1	0.572	0.572	0.572	0.572	0.573	0.573	0.574	0.574	0.576	0.577	0.579	0.58	0.583	0.585	0.587	0.59	0.593	0.596	0.6	0.603
0.11	0.59	0.59	0.59	0.59	0.591	0.591	0.591	0.592	0.593	0.594	0.596	0.597	0.599	0.601	0.603	0.605	0.607	0.61	0.613	0.616
0.12	0.607	0.607	0.607	0.607	0.607	0.607	0.608	0.608	0.609	0.61	0.611	0.612	0.613	0.615	0.617	0.618	0.62	0.623	0.625	0.628
0.13	0.623	0.623	0.623	0.623	0.623	0.623	0.623	0.624	0.624	0.625	0.626	0.627	0.628	0.629	0.631	0.632	0.634	0.636	0.638	0.640
0.14	0.636	0.636	0.636	0.636	0.636	0.636	0.636	0.637	0.637	0.637	0.638	0.639	0.64	0.641	0.642	0.644	0.645	0.647	0.649	0.651
0.15	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.651	0.651	0.652	0.653	0.654	0.655	0.656	0.657	0.659	0.66	0.662
0.16	0.66	0.66	0.66	0.66	0.66	0.66	0.661	0.661	0.661	0.661	0.662	0.662	0.663	0.664	0.665	0.666	0.667	0.668	0.67	0.671
0.17	0.672	0.672	0.672	0.672	0.672	0.672	0.672	0.672	0.673	0.673	0.673	0.674	0.674	0.675	0.675	0.676	0.677	0.678	0.68	0.681
0.18	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.683	0.683	0.683	0.684	0.684	0.685	0.685	0.686	0.687	0.689	0.690
0.19	0.692	0.692	0.692	0.692	0.692	0.692	0.692	0.692	0.692	0.692	0.693	0.693	0.693	0.694	0.694	0.695	0.695	0.696	0.698	0.699
0.2	0.703	0.703	0.703	0.703	0.703	0.703	0.703	0.703	0.703	0.703	0.703	0.703	0.704	0.704	0.704	0.705	0.705	0.706	0.707	0.708

Table E.28 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a: Weibull(1,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.538	0.54	0.545	0.551	0.559	0.567	0.576	0.586	0.595	0.603	0.614	0.625	0.635	0.644	0.654	0.663	0.672	0.68	0.689	0.698
0.02	0.622	0.623	0.624	0.626	0.629	0.633	0.638	0.643	0.648	0.653	0.66	0.667	0.673	0.679	0.686	0.693	0.699	0.705	0.712	0.719
0.03	0.676	0.676	0.677	0.678	0.679	0.681	0.683	0.686	0.688	0.692	0.696	0.7	0.704	0.708	0.713	0.718	0.723	0.728	0.733	0.738
0.04	0.714	0.714	0.714	0.714	0.715	0.716	0.717	0.718	0.72	0.722	0.725	0.728	0.731	0.734	0.737	0.741	0.745	0.748	0.753	0.757
0.05	0.745	0.745	0.745	0.745	0.746	0.746	0.747	0.748	0.749	0.75	0.752	0.753	0.755	0.757	0.76	0.762	0.765	0.768	0.771	0.774
0.06	0.769	0.769	0.769	0.769	0.769	0.769	0.77	0.77	0.771	0.772	0.773	0.774	0.775	0.777	0.779	0.781	0.783	0.785	0.787	0.790
0.07	0.785	0.785	0.785	0.785	0.786	0.786	0.786	0.786	0.787	0.787	0.788	0.789	0.79	0.791	0.792	0.794	0.796	0.797	0.799	0.801
0.08	0.802	0.802	0.802	0.802	0.802	0.802	0.802	0.802	0.803	0.803	0.804	0.804	0.805	0.806	0.807	0.808	0.809	0.81	0.812	0.814
0.09	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.815	0.816	0.816	0.817	0.817	0.818	0.819	0.82	0.821	0.822	0.824
0.1	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.827	0.827	0.827	0.827	0.828	0.828	0.829	0.829	0.83	0.831	0.832	0.833
0.11	0.837	0.837	0.837	0.837	0.837	0.837	0.837	0.837	0.837	0.837	0.837	0.838	0.838	0.838	0.838	0.839	0.84	0.84	0.841	0.842
0.12	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.848	0.848	0.848	0.848	0.849	0.849	0.85	0.851
0.13	0.856	0.856	0.856	0.856	0.856	0.856	0.856	0.856	0.856	0.856	0.856	0.856	0.857	0.857	0.857	0.857	0.858	0.858	0.858	0.859
0.14	0.864	0.864	0.864	0.864	0.864	0.864	0.864	0.864	0.864	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.866	0.866	0.866	0.866
0.15	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.873	0.873	0.873
0.16	0.878	0.878	0.878	0.878	0.878	0.878	0.878	0.878	0.878	0.878	0.878	0.878	0.878	0.878	0.878	0.878	0.878	0.878	0.879	0.879
0.17	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.884	0.885
0.18	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.89	0.89	0.89	0.890
0.19	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.895	0.895	0.895	0.895
0.2	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.900

Table E.29 Power Study: Sequential Test, n = 5 - H_0 : Gamma(1,1); H_a: Norm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.033	0.037	0.04	0.044	0.048	0.052	0.056	0.061	0.066	0.07	0.075	0.08	0.084	0.089	0.095	0.1	0.105	0.11	0.115	0.121
0.02	0.063	0.066	0.07	0.073	0.077	0.082	0.086	0.091	0.095	0.1	0.105	0.109	0.114	0.119	0.124	0.13	0.134	0.139	0.145	0.151
0.03	0.088	0.091	0.094	0.098	0.102	0.106	0.11	0.115	0.12	0.124	0.129	0.134	0.138	0.143	0.149	0.154	0.159	0.164	0.169	0.175
0.04	0.113	0.116	0.119	0.122	0.126	0.13	0.135	0.14	0.144	0.149	0.153	0.158	0.162	0.168	0.173	0.178	0.183	0.188	0.194	0.199
0.05	0.135	0.138	0.141	0.144	0.148	0.152	0.156	0.161	0.166	0.171	0.175	0.18	0.184	0.189	0.195	0.2	0.205	0.21	0.216	0.221
0.06	0.158	0.161	0.164	0.167	0.171	0.175	0.179	0.184	0.188	0.193	0.198	0.202	0.207	0.212	0.217	0.223	0.227	0.232	0.238	0.244
0.07	0.177	0.18	0.183	0.187	0.19	0.194	0.198	0.202	0.207	0.212	0.216	0.221	0.225	0.231	0.236	0.241	0.246	0.251	0.257	0.262
0.08	0.195	0.198	0.201	0.205	0.208	0.212	0.215	0.22	0.225	0.229	0.234	0.238	0.243	0.248	0.253	0.259	0.263	0.268	0.274	0.280
0.09	0.212	0.215	0.218	0.221	0.225	0.229	0.232	0.237	0.241	0.245	0.25	0.254	0.259	0.264	0.269	0.275	0.279	0.284	0.29	0.296
0.1	0.229	0.232	0.235	0.238	0.241	0.245	0.249	0.253	0.257	0.261	0.266	0.271	0.275	0.28	0.286	0.291	0.296	0.3	0.306	0.312
0.11	0.244	0.247	0.25	0.254	0.257	0.261	0.265	0.269	0.273	0.277	0.281	0.286	0.29	0.295	0.301	0.306	0.31	0.315	0.321	0.326
0.12	0.258	0.26	0.263	0.267	0.27	0.274	0.277	0.281	0.285	0.289	0.293	0.297	0.302	0.307	0.312	0.317	0.321	0.326	0.332	0.337
0.13	0.269	0.271	0.274	0.277	0.28	0.284	0.287	0.291	0.295	0.299	0.303	0.307	0.311	0.316	0.32	0.326	0.33	0.335	0.34	0.346
0.14	0.28	0.282	0.284	0.287	0.29	0.294	0.297	0.301	0.305	0.308	0.312	0.316	0.32	0.324	0.329	0.334	0.338	0.343	0.349	0.354
0.15	0.292	0.293	0.295	0.298	0.301	0.304	0.307	0.311	0.315	0.318	0.322	0.326	0.329	0.334	0.338	0.343	0.347	0.352	0.357	0.362
0.16	0.304	0.306	0.307	0.31	0.312	0.315	0.318	0.322	0.325	0.329	0.333	0.336	0.34	0.344	0.348	0.352	0.356	0.361	0.366	0.371
0.17	0.316	0.317	0.319	0.321	0.323	0.326	0.328	0.332	0.336	0.339	0.343	0.346	0.349	0.354	0.357	0.362	0.366	0.37	0.375	0.380
0.18	0.328	0.329	0.331	0.333	0.334	0.337	0.339	0.343	0.346	0.349	0.353	0.356	0.359	0.363	0.367	0.371	0.375	0.379	0.384	0.389
0.19	0.339	0.34	0.342	0.344	0.345	0.348	0.35	0.353	0.356	0.36	0.363	0.366	0.369	0.373	0.377	0.381	0.384	0.388	0.392	0.397
0.2	0.35	0.351	0.353	0.354	0.356	0.358	0.36	0.363	0.366	0.37	0.373	0.376	0.379	0.383	0.386	0.39	0.393	0.396	0.401	0.405

Table E.30 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a: Norm(0,1)

Skewness Test Significance Level (α)		Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
& 0.01	0.387	0.391	0.395	0.4	0.405	0.411	0.416	0.423	0.428	0.435	0.442	0.449	0.456	0.461	0.468	0.474	0.481	0.488	0.495	0.503	
	0.02	0.473	0.476	0.479	0.482	0.486	0.49	0.494	0.499	0.504	0.509	0.515	0.52	0.525	0.53	0.536	0.541	0.546	0.551	0.557	0.564
	0.03	0.529	0.531	0.533	0.536	0.539	0.542	0.545	0.549	0.553	0.557	0.562	0.566	0.571	0.575	0.579	0.584	0.588	0.593	0.598	0.603
	0.04	0.568	0.569	0.571	0.573	0.575	0.578	0.581	0.584	0.587	0.591	0.595	0.599	0.602	0.606	0.61	0.614	0.617	0.621	0.626	0.630
	0.05	0.602	0.603	0.604	0.606	0.608	0.61	0.612	0.615	0.617	0.621	0.624	0.627	0.63	0.633	0.637	0.64	0.643	0.646	0.651	0.655
	0.06	0.628	0.629	0.63	0.632	0.633	0.635	0.637	0.639	0.641	0.644	0.647	0.649	0.652	0.654	0.657	0.66	0.663	0.666	0.67	0.673
	0.07	0.652	0.653	0.654	0.655	0.656	0.657	0.659	0.661	0.663	0.665	0.667	0.669	0.672	0.674	0.677	0.679	0.682	0.684	0.687	0.691
	0.08	0.675	0.675	0.676	0.676	0.677	0.679	0.68	0.682	0.683	0.685	0.687	0.689	0.691	0.693	0.695	0.697	0.7	0.702	0.704	0.707
	0.09	0.694	0.694	0.695	0.695	0.696	0.697	0.698	0.699	0.701	0.702	0.704	0.705	0.707	0.709	0.711	0.713	0.715	0.717	0.719	0.722
	0.1	0.709	0.709	0.709	0.71	0.71	0.711	0.712	0.713	0.714	0.716	0.717	0.718	0.72	0.721	0.723	0.725	0.727	0.729	0.731	0.733
	0.11	0.722	0.723	0.723	0.723	0.724	0.724	0.725	0.726	0.727	0.728	0.73	0.731	0.732	0.733	0.735	0.737	0.739	0.74	0.742	0.743
	0.12	0.735	0.735	0.735	0.736	0.736	0.736	0.737	0.738	0.739	0.74	0.741	0.742	0.743	0.744	0.746	0.747	0.749	0.75	0.751	0.753
	0.13	0.747	0.747	0.747	0.747	0.747	0.748	0.749	0.749	0.75	0.751	0.752	0.753	0.754	0.755	0.756	0.757	0.759	0.76	0.761	0.763
	0.14	0.759	0.759	0.759	0.759	0.759	0.76	0.76	0.761	0.761	0.762	0.763	0.764	0.765	0.765	0.766	0.768	0.769	0.77	0.771	0.772
	0.15	0.77	0.77	0.77	0.77	0.77	0.77	0.771	0.771	0.772	0.772	0.773	0.773	0.774	0.775	0.776	0.777	0.778	0.779	0.78	0.781
	0.16	0.779	0.779	0.779	0.779	0.78	0.78	0.78	0.781	0.781	0.781	0.782	0.782	0.783	0.784	0.785	0.785	0.786	0.787	0.788	0.789
	0.17	0.788	0.788	0.788	0.788	0.789	0.789	0.789	0.789	0.79	0.79	0.791	0.791	0.792	0.792	0.793	0.794	0.795	0.795	0.796	0.797
	0.18	0.797	0.797	0.797	0.797	0.797	0.797	0.798	0.798	0.798	0.799	0.799	0.799	0.8	0.8	0.801	0.802	0.803	0.803	0.804	0.805
	0.19	0.804	0.804	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.806	0.806	0.807	0.807	0.807	0.808	0.809	0.809	0.81	0.81	0.811
	0.2	0.812	0.812	0.812	0.812	0.812	0.812	0.812	0.813	0.813	0.813	0.813	0.814	0.814	0.814	0.815	0.815	0.816	0.816	0.817	0.818

Table E.31 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a: Norm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.679	0.681	0.683	0.686	0.689	0.692	0.695	0.699	0.704	0.709	0.714	0.718	0.723	0.729	0.734	0.739	0.743	0.748	0.753	0.758
0.02	0.753	0.754	0.755	0.756	0.757	0.759	0.761	0.763	0.765	0.769	0.771	0.774	0.777	0.781	0.784	0.787	0.789	0.793	0.796	0.800
0.03	0.788	0.789	0.789	0.79	0.791	0.791	0.793	0.794	0.796	0.798	0.8	0.802	0.804	0.807	0.809	0.811	0.813	0.816	0.818	0.821
0.04	0.816	0.816	0.816	0.816	0.817	0.818	0.818	0.819	0.82	0.822	0.823	0.824	0.826	0.828	0.83	0.831	0.833	0.835	0.837	0.840
0.05	0.839	0.839	0.839	0.839	0.84	0.84	0.841	0.841	0.842	0.843	0.844	0.845	0.846	0.848	0.849	0.85	0.851	0.853	0.855	0.857
0.06	0.856	0.856	0.856	0.856	0.856	0.857	0.857	0.857	0.858	0.859	0.859	0.86	0.861	0.862	0.863	0.864	0.865	0.867	0.868	0.869
0.07	0.87	0.87	0.87	0.87	0.87	0.87	0.871	0.871	0.871	0.872	0.872	0.873	0.874	0.874	0.875	0.876	0.877	0.878	0.879	0.880
0.08	0.881	0.881	0.881	0.881	0.881	0.881	0.881	0.881	0.881	0.882	0.882	0.883	0.883	0.884	0.884	0.885	0.886	0.887	0.888	0.889
0.09	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.891	0.891	0.891	0.892	0.892	0.893	0.893	0.894	0.894	0.895	0.896
0.1	0.898	0.898	0.898	0.898	0.898	0.898	0.898	0.898	0.898	0.898	0.898	0.899	0.899	0.899	0.9	0.9	0.901	0.901	0.902	0.902
0.11	0.905	0.905	0.905	0.905	0.905	0.905	0.905	0.905	0.905	0.905	0.906	0.906	0.906	0.906	0.907	0.907	0.907	0.908	0.908	0.909
0.12	0.911	0.911	0.911	0.911	0.911	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.913	0.913	0.913	0.913	0.914	0.914	0.915
0.13	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.918	0.918	0.918	0.918	0.918	0.919	0.919	0.919
0.14	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.923	0.923	0.923	0.923	0.923	0.923	0.924
0.15	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.927	0.927	0.927	0.927	0.927
0.16	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.931	0.931	0.931
0.17	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.935	0.935
0.18	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.938	0.938	0.938	0.938	0.938	0.938
0.19	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.941	0.941	0.941	0.941	0.941
0.2	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.944	0.944	0.944	0.944	0.944	0.944

Table E.32 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a: Norm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.959	0.959	0.959	0.959	0.959	0.96	0.96	0.96	0.961	0.961	0.961	0.962	0.963	0.963	0.964	0.965	0.965	0.966	0.966	0.967
0.02	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.974	0.974	0.974	0.974	0.974	0.975	0.975	0.975	0.975	0.976
0.03	0.979	0.979	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.981	0.981	0.981
0.04	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
0.05	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.987	0.987	0.987
0.06	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.989	0.989	0.989
0.07	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.990
0.08	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
0.09	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
0.1	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993
0.11	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
0.12	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
0.13	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
0.14	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
0.15	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
0.16	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
0.17	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
0.18	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
0.19	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
0.2	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997

Table E.33 Power Study: Sequential Test, n = 5 - H_0 : Gamma(1,1); H_a: Unif(0,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.039	0.047	0.055	0.061	0.069	0.077	0.085	0.092	0.101	0.108	0.116	0.124	0.132	0.14	0.148	0.157	0.163	0.172	0.18	0.188
0.02	0.067	0.074	0.082	0.088	0.096	0.104	0.112	0.119	0.128	0.135	0.143	0.151	0.159	0.167	0.175	0.184	0.19	0.199	0.207	0.215
0.03	0.088	0.095	0.102	0.109	0.117	0.125	0.132	0.14	0.148	0.156	0.164	0.172	0.18	0.188	0.196	0.204	0.211	0.219	0.227	0.236
0.04	0.108	0.115	0.123	0.129	0.136	0.144	0.152	0.16	0.168	0.176	0.184	0.192	0.2	0.208	0.216	0.224	0.231	0.239	0.247	0.256
0.05	0.127	0.135	0.142	0.148	0.155	0.163	0.171	0.178	0.187	0.195	0.203	0.21	0.218	0.226	0.235	0.243	0.25	0.258	0.266	0.275
0.06	0.146	0.154	0.161	0.167	0.174	0.182	0.189	0.197	0.205	0.213	0.221	0.228	0.237	0.245	0.253	0.261	0.268	0.276	0.284	0.293
0.07	0.163	0.171	0.178	0.184	0.191	0.198	0.206	0.213	0.222	0.229	0.237	0.245	0.253	0.261	0.269	0.277	0.284	0.293	0.3	0.309
0.08	0.179	0.186	0.194	0.2	0.207	0.214	0.222	0.228	0.237	0.245	0.253	0.26	0.268	0.276	0.285	0.293	0.3	0.308	0.316	0.325
0.09	0.196	0.203	0.211	0.217	0.224	0.231	0.239	0.245	0.254	0.261	0.269	0.277	0.285	0.293	0.301	0.309	0.316	0.325	0.332	0.341
0.1	0.212	0.219	0.227	0.233	0.24	0.247	0.255	0.261	0.269	0.276	0.284	0.292	0.3	0.308	0.316	0.324	0.331	0.34	0.347	0.356
0.11	0.228	0.235	0.242	0.249	0.256	0.263	0.27	0.277	0.285	0.292	0.299	0.306	0.314	0.322	0.331	0.338	0.345	0.353	0.361	0.369
0.12	0.243	0.25	0.257	0.263	0.269	0.276	0.284	0.29	0.298	0.304	0.312	0.319	0.326	0.334	0.342	0.35	0.356	0.365	0.372	0.380
0.13	0.256	0.262	0.268	0.274	0.28	0.287	0.294	0.3	0.308	0.314	0.321	0.328	0.336	0.343	0.351	0.359	0.365	0.373	0.38	0.389
0.14	0.269	0.274	0.28	0.286	0.292	0.298	0.305	0.311	0.319	0.325	0.332	0.339	0.346	0.353	0.36	0.368	0.374	0.382	0.389	0.397
0.15	0.283	0.287	0.292	0.297	0.303	0.309	0.316	0.322	0.329	0.336	0.343	0.349	0.356	0.363	0.37	0.377	0.383	0.391	0.398	0.406
0.16	0.297	0.301	0.305	0.31	0.315	0.321	0.327	0.333	0.34	0.346	0.353	0.36	0.366	0.373	0.38	0.386	0.393	0.4	0.407	0.415
0.17	0.311	0.315	0.319	0.323	0.327	0.333	0.339	0.344	0.351	0.357	0.364	0.37	0.377	0.383	0.389	0.396	0.402	0.409	0.416	0.423
0.18	0.323	0.327	0.331	0.334	0.339	0.344	0.349	0.354	0.361	0.367	0.373	0.38	0.386	0.392	0.399	0.405	0.41	0.417	0.424	0.431
0.19	0.336	0.34	0.344	0.347	0.351	0.356	0.361	0.366	0.372	0.378	0.384	0.39	0.396	0.402	0.408	0.414	0.42	0.426	0.432	0.440
0.2	0.348	0.352	0.356	0.359	0.363	0.367	0.372	0.377	0.383	0.388	0.394	0.4	0.406	0.411	0.417	0.423	0.428	0.435	0.441	0.447

Table E.34 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a: Unif(0,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.394	0.429	0.46	0.486	0.514	0.539	0.56	0.582	0.602	0.621	0.64	0.656	0.673	0.686	0.7	0.713	0.725	0.737	0.75	0.762
0.02	0.494	0.52	0.544	0.564	0.585	0.605	0.621	0.639	0.655	0.67	0.685	0.699	0.712	0.723	0.734	0.745	0.755	0.766	0.776	0.786
0.03	0.559	0.58	0.598	0.614	0.631	0.648	0.661	0.676	0.69	0.703	0.716	0.727	0.738	0.748	0.757	0.767	0.776	0.784	0.793	0.802
0.04	0.606	0.622	0.637	0.65	0.664	0.678	0.689	0.702	0.714	0.726	0.737	0.747	0.757	0.765	0.774	0.783	0.791	0.799	0.807	0.815
0.05	0.644	0.657	0.669	0.679	0.691	0.704	0.714	0.725	0.735	0.745	0.755	0.764	0.773	0.781	0.788	0.796	0.803	0.81	0.817	0.825
0.06	0.675	0.686	0.696	0.705	0.715	0.725	0.734	0.744	0.752	0.762	0.77	0.778	0.786	0.793	0.8	0.807	0.813	0.819	0.826	0.833
0.07	0.703	0.711	0.719	0.727	0.735	0.744	0.752	0.76	0.768	0.776	0.783	0.791	0.798	0.804	0.81	0.817	0.822	0.828	0.835	0.841
0.08	0.728	0.735	0.742	0.748	0.755	0.763	0.769	0.776	0.783	0.79	0.797	0.804	0.81	0.816	0.821	0.827	0.832	0.837	0.843	0.849
0.09	0.75	0.755	0.761	0.766	0.772	0.779	0.784	0.791	0.797	0.803	0.808	0.815	0.821	0.826	0.83	0.836	0.84	0.845	0.851	0.856
0.1	0.768	0.772	0.776	0.78	0.785	0.791	0.796	0.802	0.807	0.813	0.818	0.824	0.829	0.834	0.838	0.843	0.847	0.852	0.857	0.861
0.11	0.784	0.788	0.792	0.795	0.799	0.804	0.809	0.814	0.818	0.823	0.828	0.833	0.838	0.842	0.846	0.85	0.854	0.858	0.863	0.867
0.12	0.799	0.802	0.805	0.807	0.811	0.815	0.82	0.824	0.828	0.832	0.836	0.841	0.845	0.849	0.853	0.857	0.86	0.864	0.868	0.872
0.13	0.812	0.814	0.817	0.819	0.822	0.826	0.83	0.834	0.837	0.841	0.844	0.848	0.852	0.856	0.859	0.863	0.865	0.869	0.873	0.877
0.14	0.824	0.825	0.827	0.829	0.832	0.835	0.838	0.842	0.845	0.848	0.851	0.855	0.858	0.861	0.864	0.868	0.87	0.874	0.877	0.881
0.15	0.834	0.836	0.837	0.839	0.841	0.844	0.846	0.849	0.852	0.855	0.858	0.861	0.864	0.867	0.87	0.873	0.875	0.879	0.882	0.885
0.16	0.844	0.845	0.847	0.848	0.85	0.853	0.855	0.857	0.859	0.862	0.865	0.868	0.87	0.873	0.875	0.878	0.88	0.883	0.886	0.890
0.17	0.854	0.855	0.856	0.857	0.858	0.861	0.862	0.864	0.867	0.869	0.871	0.874	0.876	0.879	0.881	0.883	0.885	0.888	0.891	0.894
0.18	0.863	0.863	0.864	0.865	0.866	0.868	0.87	0.872	0.874	0.875	0.878	0.88	0.882	0.884	0.886	0.888	0.89	0.893	0.895	0.898
0.19	0.871	0.872	0.872	0.873	0.874	0.875	0.877	0.878	0.88	0.881	0.883	0.885	0.888	0.89	0.891	0.893	0.895	0.897	0.9	0.902
0.2	0.878	0.878	0.879	0.879	0.88	0.881	0.882	0.884	0.885	0.887	0.889	0.89	0.892	0.894	0.896	0.898	0.899	0.901	0.903	0.906

Table E.35 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a: Unif(0,2)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.784	0.811	0.834	0.853	0.871	0.884	0.898	0.91	0.919	0.929	0.937	0.943	0.949	0.955	0.959	0.963	0.966	0.969	0.972	0.974
	0.02	0.851	0.865	0.877	0.889	0.9	0.909	0.918	0.927	0.934	0.941	0.947	0.952	0.956	0.961	0.964	0.967	0.97	0.972	0.975	0.977
	0.03	0.884	0.893	0.901	0.909	0.917	0.923	0.931	0.937	0.943	0.948	0.953	0.957	0.961	0.965	0.968	0.97	0.973	0.975	0.977	0.979
	0.04	0.908	0.913	0.918	0.924	0.93	0.935	0.94	0.945	0.949	0.954	0.958	0.962	0.964	0.968	0.97	0.973	0.975	0.977	0.979	0.980
	0.05	0.926	0.929	0.933	0.937	0.941	0.944	0.948	0.952	0.955	0.959	0.962	0.965	0.968	0.971	0.973	0.975	0.977	0.978	0.98	0.982
	0.06	0.939	0.941	0.943	0.946	0.949	0.951	0.954	0.957	0.96	0.963	0.966	0.968	0.971	0.973	0.975	0.977	0.979	0.98	0.982	0.983
	0.07	0.95	0.951	0.952	0.954	0.956	0.958	0.961	0.963	0.964	0.967	0.969	0.971	0.973	0.976	0.977	0.979	0.98	0.982	0.983	0.984
	0.08	0.957	0.957	0.958	0.96	0.961	0.963	0.965	0.966	0.968	0.97	0.972	0.974	0.975	0.977	0.979	0.98	0.982	0.983	0.984	0.985
	0.09	0.962	0.963	0.964	0.965	0.966	0.967	0.969	0.97	0.971	0.973	0.974	0.976	0.977	0.979	0.98	0.981	0.983	0.984	0.985	0.986
	0.1	0.967	0.967	0.968	0.968	0.969	0.97	0.972	0.973	0.974	0.975	0.976	0.978	0.979	0.98	0.981	0.982	0.984	0.985	0.986	0.987
	0.11	0.971	0.972	0.972	0.973	0.973	0.974	0.975	0.975	0.976	0.977	0.978	0.98	0.981	0.982	0.983	0.984	0.985	0.986	0.987	0.988
	0.12	0.975	0.975	0.975	0.976	0.976	0.977	0.977	0.978	0.979	0.979	0.98	0.981	0.982	0.983	0.984	0.985	0.986	0.986	0.987	0.988
	0.13	0.978	0.978	0.978	0.978	0.978	0.979	0.979	0.98	0.98	0.981	0.982	0.983	0.983	0.984	0.985	0.986	0.987	0.987	0.988	0.989
	0.14	0.98	0.98	0.98	0.98	0.98	0.981	0.981	0.981	0.982	0.982	0.983	0.984	0.985	0.985	0.986	0.986	0.987	0.988	0.989	0.989
	0.15	0.982	0.982	0.982	0.982	0.982	0.983	0.983	0.983	0.983	0.984	0.984	0.985	0.986	0.986	0.987	0.987	0.988	0.989	0.989	0.990
	0.16	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.985	0.985	0.985	0.986	0.986	0.987	0.987	0.988	0.988	0.989	0.989	0.99	0.990
	0.17	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.987	0.987	0.987	0.988	0.988	0.989	0.989	0.989	0.99	0.99	0.991	0.991
	0.18	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.988	0.988	0.988	0.988	0.989	0.989	0.99	0.99	0.99	0.991	0.991	0.992
	0.19	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.989	0.989	0.989	0.989	0.99	0.99	0.99	0.991	0.991	0.992	0.992
	0.2	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.99	0.99	0.99	0.99	0.991	0.991	0.991	0.992	0.992	0.992	0.993

Table E.36 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a: Unif(0,2)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.998	0.999	0.999	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.02	0.999	0.999	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.03	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.04	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.05	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.06	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.07	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.08	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.09	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
	0.2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000

Table E.37 Power Study: Sequential Test, n = 5 - H_0 : Gamma(1,1); H_a: Gamma(1,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.016	0.026	0.036	0.046	0.056	0.066	0.076	0.086	0.096	0.106	0.116	0.125	0.135	0.145	0.154	0.164	0.174	0.184	0.194	0.204
0.02	0.026	0.032	0.042	0.051	0.062	0.071	0.081	0.091	0.102	0.112	0.121	0.131	0.141	0.15	0.16	0.169	0.179	0.189	0.199	0.209
0.03	0.036	0.041	0.047	0.056	0.067	0.076	0.086	0.096	0.107	0.116	0.126	0.135	0.145	0.155	0.164	0.174	0.184	0.194	0.204	0.214
0.04	0.046	0.051	0.056	0.061	0.071	0.081	0.091	0.101	0.111	0.121	0.131	0.14	0.15	0.16	0.169	0.178	0.189	0.199	0.208	0.219
0.05	0.056	0.061	0.066	0.071	0.077	0.086	0.096	0.106	0.116	0.126	0.135	0.145	0.155	0.165	0.174	0.183	0.194	0.204	0.213	0.224
0.06	0.065	0.07	0.076	0.08	0.086	0.091	0.1	0.111	0.121	0.131	0.14	0.15	0.16	0.17	0.179	0.188	0.199	0.209	0.218	0.228
0.07	0.075	0.081	0.086	0.09	0.096	0.101	0.107	0.116	0.126	0.136	0.145	0.155	0.165	0.175	0.184	0.193	0.204	0.214	0.223	0.234
0.08	0.086	0.091	0.096	0.101	0.107	0.111	0.117	0.123	0.131	0.141	0.151	0.16	0.17	0.18	0.189	0.199	0.209	0.219	0.229	0.239
0.09	0.097	0.102	0.107	0.111	0.117	0.122	0.127	0.132	0.138	0.146	0.155	0.165	0.175	0.185	0.194	0.203	0.214	0.223	0.233	0.243
0.1	0.106	0.112	0.117	0.121	0.127	0.132	0.137	0.142	0.147	0.152	0.16	0.17	0.18	0.19	0.199	0.208	0.219	0.229	0.238	0.248
0.11	0.116	0.121	0.126	0.131	0.137	0.141	0.146	0.151	0.156	0.161	0.167	0.174	0.184	0.194	0.203	0.213	0.223	0.233	0.242	0.253
0.12	0.126	0.131	0.136	0.141	0.146	0.151	0.156	0.161	0.166	0.17	0.175	0.181	0.189	0.198	0.208	0.217	0.227	0.237	0.247	0.257
0.13	0.136	0.141	0.146	0.15	0.155	0.16	0.165	0.17	0.174	0.179	0.184	0.189	0.195	0.202	0.211	0.22	0.23	0.24	0.25	0.260
0.14	0.145	0.15	0.154	0.159	0.164	0.168	0.173	0.178	0.183	0.187	0.192	0.196	0.202	0.208	0.215	0.223	0.233	0.243	0.253	0.263
0.15	0.156	0.16	0.164	0.168	0.173	0.178	0.182	0.187	0.192	0.196	0.201	0.205	0.21	0.215	0.221	0.228	0.237	0.247	0.256	0.266
0.16	0.165	0.169	0.173	0.177	0.182	0.186	0.191	0.196	0.2	0.205	0.209	0.214	0.218	0.223	0.228	0.234	0.242	0.25	0.259	0.270
0.17	0.175	0.179	0.183	0.186	0.191	0.195	0.2	0.204	0.208	0.213	0.217	0.222	0.226	0.231	0.236	0.241	0.247	0.255	0.263	0.273
0.18	0.185	0.189	0.193	0.196	0.2	0.204	0.209	0.213	0.217	0.222	0.226	0.23	0.235	0.24	0.244	0.249	0.255	0.261	0.268	0.277
0.19	0.194	0.199	0.202	0.205	0.209	0.213	0.217	0.222	0.226	0.23	0.234	0.238	0.243	0.248	0.252	0.256	0.262	0.267	0.274	0.281
0.2	0.204	0.208	0.212	0.215	0.219	0.223	0.227	0.231	0.235	0.239	0.243	0.247	0.252	0.256	0.26	0.265	0.27	0.275	0.28	0.287

Table E.38 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a: Gamma(1,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.015	0.025	0.035	0.044	0.054	0.064	0.074	0.084	0.094	0.104	0.114	0.123	0.133	0.143	0.152	0.162	0.173	0.182	0.192	0.203
0.02	0.024	0.029	0.039	0.047	0.057	0.067	0.076	0.087	0.096	0.106	0.116	0.125	0.135	0.144	0.154	0.163	0.174	0.184	0.193	0.204
0.03	0.034	0.038	0.043	0.051	0.06	0.07	0.079	0.09	0.099	0.108	0.118	0.127	0.137	0.146	0.155	0.165	0.175	0.185	0.194	0.205
0.04	0.043	0.047	0.051	0.056	0.064	0.073	0.082	0.092	0.101	0.11	0.12	0.129	0.139	0.148	0.157	0.166	0.177	0.186	0.195	0.206
0.05	0.052	0.056	0.06	0.063	0.068	0.076	0.085	0.095	0.103	0.113	0.122	0.131	0.14	0.149	0.159	0.168	0.178	0.188	0.197	0.207
0.06	0.062	0.065	0.069	0.071	0.075	0.081	0.088	0.097	0.106	0.115	0.124	0.133	0.142	0.151	0.16	0.169	0.18	0.189	0.198	0.208
0.07	0.07	0.074	0.077	0.08	0.083	0.087	0.092	0.1	0.108	0.117	0.126	0.135	0.144	0.153	0.162	0.171	0.181	0.191	0.2	0.210
0.08	0.081	0.083	0.086	0.089	0.092	0.096	0.099	0.105	0.112	0.12	0.129	0.138	0.147	0.155	0.164	0.173	0.183	0.192	0.201	0.211
0.09	0.091	0.093	0.096	0.098	0.101	0.104	0.107	0.111	0.116	0.124	0.132	0.14	0.149	0.157	0.166	0.175	0.185	0.194	0.203	0.213
0.1	0.099	0.102	0.104	0.106	0.109	0.112	0.115	0.118	0.122	0.128	0.135	0.143	0.151	0.159	0.168	0.177	0.186	0.195	0.204	0.214
0.11	0.109	0.111	0.113	0.115	0.118	0.121	0.123	0.127	0.13	0.134	0.14	0.146	0.154	0.162	0.17	0.179	0.188	0.197	0.206	0.216
0.12	0.119	0.12	0.122	0.124	0.126	0.129	0.132	0.135	0.137	0.141	0.145	0.15	0.157	0.165	0.173	0.181	0.19	0.199	0.208	0.217
0.13	0.129	0.13	0.132	0.134	0.136	0.138	0.141	0.144	0.146	0.149	0.153	0.157	0.162	0.169	0.176	0.184	0.193	0.202	0.21	0.219
0.14	0.139	0.14	0.141	0.143	0.145	0.147	0.149	0.152	0.154	0.157	0.16	0.163	0.168	0.173	0.18	0.187	0.196	0.204	0.212	0.221
0.15	0.149	0.15	0.151	0.152	0.154	0.156	0.158	0.161	0.163	0.166	0.168	0.171	0.175	0.179	0.185	0.191	0.199	0.207	0.215	0.224
0.16	0.16	0.16	0.161	0.162	0.164	0.166	0.168	0.17	0.173	0.175	0.177	0.18	0.183	0.187	0.192	0.197	0.204	0.211	0.218	0.226
0.17	0.17	0.171	0.172	0.172	0.174	0.176	0.177	0.179	0.182	0.184	0.186	0.188	0.191	0.194	0.198	0.202	0.209	0.215	0.221	0.229
0.18	0.18	0.181	0.182	0.182	0.183	0.185	0.187	0.189	0.191	0.193	0.195	0.197	0.199	0.202	0.205	0.209	0.214	0.22	0.226	0.233
0.19	0.191	0.191	0.192	0.193	0.193	0.195	0.196	0.198	0.2	0.202	0.204	0.206	0.208	0.21	0.213	0.216	0.221	0.226	0.231	0.238
0.2	0.201	0.201	0.202	0.202	0.203	0.204	0.205	0.207	0.209	0.21	0.212	0.214	0.216	0.218	0.221	0.224	0.228	0.232	0.237	0.243

Table E.39 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a: Gamma(1,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.014	0.023	0.032	0.041	0.05	0.06	0.07	0.079	0.089	0.099	0.109	0.12	0.13	0.14	0.152	0.162	0.172	0.182	0.194	0.204
0.02	0.022	0.027	0.035	0.044	0.052	0.062	0.071	0.08	0.09	0.1	0.11	0.12	0.13	0.141	0.152	0.163	0.172	0.183	0.194	0.205
0.03	0.032	0.035	0.039	0.046	0.055	0.064	0.073	0.081	0.091	0.101	0.111	0.121	0.131	0.141	0.153	0.163	0.172	0.183	0.195	0.205
0.04	0.041	0.043	0.046	0.05	0.057	0.066	0.075	0.083	0.093	0.103	0.112	0.122	0.132	0.142	0.153	0.164	0.173	0.183	0.195	0.205
0.05	0.051	0.052	0.055	0.057	0.062	0.07	0.078	0.086	0.095	0.105	0.114	0.124	0.133	0.144	0.155	0.165	0.174	0.184	0.196	0.206
0.06	0.061	0.062	0.065	0.067	0.07	0.074	0.081	0.088	0.097	0.107	0.116	0.126	0.135	0.145	0.156	0.166	0.175	0.185	0.196	0.206
0.07	0.071	0.072	0.073	0.075	0.078	0.081	0.086	0.092	0.1	0.109	0.118	0.127	0.136	0.146	0.157	0.167	0.176	0.186	0.197	0.207
0.08	0.082	0.082	0.084	0.085	0.087	0.09	0.093	0.097	0.104	0.112	0.121	0.13	0.138	0.148	0.159	0.168	0.177	0.187	0.198	0.208
0.09	0.092	0.092	0.094	0.095	0.096	0.098	0.101	0.103	0.109	0.116	0.124	0.132	0.141	0.15	0.16	0.17	0.178	0.188	0.199	0.209
0.1	0.102	0.103	0.104	0.105	0.106	0.108	0.11	0.112	0.116	0.122	0.128	0.136	0.144	0.153	0.162	0.172	0.18	0.19	0.2	0.210
0.11	0.112	0.112	0.113	0.114	0.115	0.116	0.118	0.12	0.123	0.127	0.133	0.139	0.147	0.155	0.165	0.174	0.182	0.191	0.202	0.211
0.12	0.121	0.121	0.122	0.123	0.124	0.125	0.126	0.128	0.131	0.134	0.138	0.144	0.151	0.159	0.167	0.176	0.184	0.193	0.203	0.212
0.13	0.132	0.132	0.132	0.133	0.134	0.135	0.136	0.137	0.139	0.142	0.146	0.15	0.156	0.163	0.171	0.179	0.186	0.196	0.206	0.214
0.14	0.143	0.143	0.143	0.143	0.144	0.145	0.146	0.147	0.149	0.151	0.154	0.157	0.162	0.168	0.175	0.183	0.19	0.199	0.208	0.217
0.15	0.153	0.153	0.153	0.153	0.154	0.154	0.155	0.156	0.158	0.16	0.162	0.165	0.169	0.174	0.18	0.187	0.193	0.202	0.211	0.219
0.16	0.162	0.162	0.162	0.162	0.163	0.164	0.164	0.165	0.166	0.168	0.17	0.173	0.176	0.18	0.185	0.192	0.197	0.205	0.214	0.222
0.17	0.172	0.172	0.172	0.172	0.172	0.173	0.173	0.174	0.175	0.177	0.179	0.181	0.184	0.187	0.192	0.197	0.203	0.21	0.217	0.225
0.18	0.181	0.181	0.181	0.182	0.182	0.182	0.183	0.183	0.184	0.186	0.187	0.189	0.191	0.194	0.198	0.203	0.208	0.214	0.221	0.228
0.19	0.191	0.191	0.191	0.191	0.191	0.192	0.192	0.192	0.193	0.194	0.196	0.198	0.199	0.202	0.205	0.209	0.213	0.219	0.226	0.232
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.201	0.201	0.202	0.203	0.204	0.205	0.207	0.209	0.212	0.216	0.219	0.225	0.231	0.237

Table E.40 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a: Gamma(1,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.012	0.021	0.031	0.042	0.05	0.061	0.071	0.081	0.091	0.101	0.112	0.121	0.131	0.141	0.15	0.16	0.169	0.179	0.188	0.198
0.02	0.021	0.024	0.033	0.043	0.051	0.061	0.071	0.081	0.092	0.102	0.112	0.122	0.131	0.141	0.151	0.16	0.169	0.179	0.188	0.198
0.03	0.03	0.032	0.037	0.045	0.053	0.063	0.072	0.082	0.092	0.102	0.112	0.122	0.132	0.141	0.151	0.16	0.169	0.179	0.188	0.198
0.04	0.04	0.042	0.044	0.049	0.056	0.064	0.074	0.083	0.093	0.103	0.113	0.122	0.132	0.142	0.151	0.16	0.17	0.179	0.188	0.198
0.05	0.05	0.051	0.053	0.056	0.06	0.067	0.076	0.085	0.094	0.104	0.114	0.123	0.132	0.142	0.151	0.161	0.17	0.179	0.188	0.198
0.06	0.061	0.062	0.063	0.064	0.067	0.072	0.079	0.087	0.096	0.105	0.115	0.124	0.133	0.143	0.152	0.161	0.17	0.18	0.189	0.198
0.07	0.072	0.072	0.073	0.074	0.076	0.079	0.084	0.091	0.099	0.107	0.117	0.125	0.134	0.144	0.153	0.162	0.171	0.18	0.189	0.199
0.08	0.082	0.082	0.083	0.084	0.085	0.088	0.091	0.096	0.103	0.11	0.119	0.127	0.136	0.145	0.154	0.163	0.172	0.181	0.19	0.199
0.09	0.092	0.092	0.092	0.093	0.094	0.096	0.098	0.102	0.107	0.114	0.121	0.129	0.137	0.146	0.155	0.164	0.172	0.181	0.19	0.200
0.1	0.101	0.101	0.101	0.102	0.102	0.104	0.105	0.108	0.112	0.118	0.125	0.132	0.14	0.148	0.156	0.165	0.173	0.182	0.191	0.200
0.11	0.11	0.11	0.11	0.111	0.111	0.113	0.114	0.116	0.119	0.123	0.129	0.136	0.143	0.15	0.158	0.166	0.174	0.183	0.192	0.201
0.12	0.12	0.12	0.12	0.12	0.121	0.121	0.123	0.124	0.126	0.13	0.135	0.14	0.146	0.153	0.161	0.168	0.176	0.185	0.193	0.202
0.13	0.13	0.13	0.13	0.13	0.131	0.131	0.132	0.133	0.135	0.137	0.141	0.146	0.151	0.158	0.164	0.171	0.178	0.186	0.194	0.203
0.14	0.14	0.14	0.14	0.14	0.141	0.141	0.142	0.143	0.144	0.146	0.149	0.153	0.157	0.163	0.169	0.175	0.181	0.189	0.197	0.205
0.15	0.15	0.15	0.15	0.15	0.15	0.151	0.152	0.152	0.153	0.155	0.157	0.16	0.164	0.168	0.173	0.179	0.185	0.193	0.2	0.208
0.16	0.16	0.16	0.16	0.16	0.161	0.161	0.161	0.162	0.163	0.164	0.165	0.168	0.171	0.175	0.179	0.184	0.19	0.196	0.203	0.210
0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.171	0.171	0.172	0.173	0.174	0.176	0.178	0.182	0.186	0.19	0.195	0.201	0.207	0.214
0.18	0.179	0.179	0.179	0.179	0.179	0.18	0.18	0.18	0.181	0.181	0.183	0.184	0.186	0.189	0.192	0.196	0.201	0.206	0.211	0.218
0.19	0.188	0.188	0.188	0.188	0.188	0.189	0.189	0.189	0.19	0.19	0.191	0.193	0.194	0.197	0.199	0.203	0.207	0.211	0.216	0.222
0.2	0.199	0.199	0.199	0.199	0.199	0.199	0.2	0.2	0.2	0.201	0.202	0.203	0.204	0.206	0.208	0.211	0.214	0.218	0.223	0.228

Table E.41 Power Study: Sequential Test, n = 5 - H_0 : Gamma(1,1); H_a: Gamma(2,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.014	0.02	0.026	0.033	0.039	0.046	0.053	0.06	0.067	0.074	0.082	0.089	0.097	0.104	0.113	0.121	0.129	0.136	0.144	0.153
0.02	0.025	0.029	0.035	0.042	0.048	0.055	0.062	0.069	0.076	0.083	0.091	0.098	0.106	0.114	0.122	0.13	0.138	0.146	0.153	0.162
0.03	0.036	0.04	0.044	0.051	0.057	0.063	0.07	0.078	0.085	0.092	0.099	0.106	0.114	0.122	0.13	0.138	0.146	0.154	0.162	0.170
0.04	0.046	0.05	0.054	0.059	0.065	0.072	0.079	0.086	0.093	0.1	0.108	0.115	0.123	0.131	0.139	0.147	0.155	0.163	0.171	0.179
0.05	0.057	0.06	0.065	0.069	0.074	0.081	0.088	0.095	0.102	0.109	0.117	0.124	0.132	0.139	0.148	0.156	0.164	0.171	0.179	0.187
0.06	0.067	0.071	0.075	0.08	0.085	0.089	0.096	0.103	0.11	0.117	0.125	0.132	0.14	0.147	0.156	0.164	0.172	0.18	0.187	0.196
0.07	0.079	0.083	0.087	0.091	0.096	0.1	0.105	0.111	0.118	0.125	0.133	0.14	0.148	0.156	0.164	0.172	0.18	0.188	0.196	0.204
0.08	0.089	0.093	0.097	0.102	0.106	0.11	0.115	0.12	0.126	0.133	0.141	0.148	0.156	0.164	0.172	0.18	0.188	0.196	0.204	0.212
0.09	0.1	0.104	0.108	0.113	0.117	0.121	0.125	0.13	0.135	0.141	0.149	0.156	0.164	0.172	0.18	0.188	0.196	0.204	0.212	0.220
0.1	0.111	0.115	0.119	0.124	0.129	0.133	0.137	0.142	0.146	0.151	0.157	0.164	0.172	0.18	0.188	0.196	0.204	0.212	0.22	0.228
0.11	0.122	0.125	0.13	0.134	0.139	0.143	0.147	0.152	0.156	0.16	0.166	0.172	0.18	0.187	0.196	0.204	0.211	0.219	0.227	0.235
0.12	0.132	0.136	0.14	0.144	0.148	0.152	0.157	0.161	0.166	0.17	0.174	0.179	0.186	0.193	0.202	0.21	0.217	0.225	0.233	0.241
0.13	0.141	0.145	0.148	0.153	0.157	0.161	0.165	0.17	0.174	0.178	0.182	0.187	0.193	0.199	0.207	0.215	0.222	0.23	0.238	0.246
0.14	0.15	0.153	0.157	0.161	0.165	0.169	0.173	0.178	0.182	0.186	0.19	0.195	0.2	0.205	0.212	0.22	0.227	0.235	0.243	0.251
0.15	0.16	0.163	0.166	0.171	0.174	0.178	0.182	0.187	0.191	0.194	0.199	0.203	0.208	0.213	0.219	0.225	0.232	0.24	0.247	0.255
0.16	0.17	0.172	0.175	0.179	0.183	0.186	0.19	0.194	0.198	0.202	0.206	0.211	0.215	0.22	0.226	0.231	0.237	0.245	0.252	0.260
0.17	0.179	0.182	0.185	0.188	0.192	0.195	0.199	0.203	0.207	0.211	0.215	0.219	0.224	0.228	0.233	0.238	0.244	0.25	0.257	0.264
0.18	0.187	0.19	0.193	0.196	0.199	0.202	0.206	0.21	0.214	0.218	0.222	0.226	0.231	0.235	0.24	0.244	0.249	0.255	0.261	0.269
0.19	0.197	0.199	0.202	0.205	0.209	0.212	0.215	0.219	0.223	0.226	0.23	0.234	0.239	0.243	0.248	0.252	0.256	0.261	0.267	0.274
0.2	0.206	0.209	0.212	0.215	0.218	0.221	0.224	0.228	0.231	0.235	0.239	0.243	0.247	0.251	0.256	0.26	0.264	0.269	0.274	0.280

Table E.42 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a: Gamma(2,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.029	0.035	0.043	0.05	0.058	0.067	0.075	0.084	0.093	0.102	0.111	0.12	0.131	0.139	0.149	0.157	0.166	0.177	0.186	0.196
0.02	0.046	0.051	0.058	0.064	0.072	0.08	0.087	0.096	0.104	0.112	0.121	0.13	0.14	0.148	0.158	0.165	0.173	0.184	0.193	0.203
0.03	0.062	0.066	0.07	0.076	0.084	0.091	0.098	0.106	0.114	0.122	0.13	0.139	0.148	0.156	0.165	0.172	0.18	0.19	0.199	0.208
0.04	0.076	0.079	0.083	0.087	0.094	0.101	0.108	0.115	0.123	0.13	0.138	0.146	0.155	0.163	0.171	0.178	0.186	0.196	0.204	0.214
0.05	0.09	0.093	0.096	0.1	0.105	0.111	0.118	0.125	0.132	0.139	0.146	0.154	0.162	0.17	0.178	0.185	0.193	0.202	0.21	0.219
0.06	0.103	0.106	0.109	0.111	0.116	0.121	0.127	0.133	0.14	0.147	0.154	0.161	0.169	0.176	0.184	0.191	0.198	0.208	0.216	0.224
0.07	0.117	0.119	0.122	0.124	0.128	0.132	0.136	0.142	0.149	0.155	0.162	0.169	0.177	0.183	0.191	0.197	0.205	0.214	0.221	0.230
0.08	0.131	0.133	0.135	0.137	0.14	0.143	0.147	0.152	0.158	0.164	0.17	0.176	0.184	0.191	0.198	0.204	0.211	0.22	0.227	0.235
0.09	0.145	0.146	0.148	0.15	0.152	0.155	0.158	0.162	0.167	0.172	0.178	0.184	0.192	0.198	0.205	0.21	0.217	0.226	0.233	0.241
0.1	0.158	0.159	0.16	0.162	0.164	0.167	0.169	0.173	0.176	0.181	0.187	0.192	0.199	0.206	0.212	0.217	0.224	0.232	0.239	0.247
0.11	0.169	0.17	0.172	0.173	0.175	0.177	0.18	0.183	0.185	0.189	0.194	0.2	0.206	0.212	0.219	0.224	0.23	0.238	0.245	0.252
0.12	0.18	0.181	0.182	0.183	0.185	0.187	0.189	0.192	0.194	0.198	0.202	0.206	0.212	0.218	0.224	0.229	0.235	0.243	0.25	0.257
0.13	0.193	0.194	0.194	0.196	0.197	0.199	0.201	0.203	0.205	0.208	0.211	0.215	0.22	0.226	0.231	0.236	0.242	0.249	0.256	0.262
0.14	0.204	0.205	0.205	0.206	0.208	0.209	0.211	0.213	0.215	0.217	0.22	0.223	0.228	0.233	0.238	0.242	0.248	0.255	0.261	0.268
0.15	0.216	0.217	0.217	0.218	0.219	0.221	0.222	0.224	0.226	0.228	0.23	0.233	0.237	0.241	0.245	0.249	0.255	0.261	0.267	0.274
0.16	0.228	0.228	0.229	0.23	0.231	0.232	0.233	0.235	0.236	0.238	0.24	0.242	0.246	0.249	0.253	0.257	0.262	0.268	0.274	0.280
0.17	0.241	0.241	0.242	0.243	0.243	0.245	0.246	0.247	0.248	0.25	0.252	0.254	0.257	0.26	0.263	0.266	0.271	0.276	0.281	0.287
0.18	0.253	0.253	0.254	0.254	0.255	0.256	0.257	0.258	0.259	0.261	0.262	0.264	0.267	0.269	0.272	0.275	0.278	0.284	0.289	0.294
0.19	0.264	0.265	0.265	0.265	0.266	0.267	0.268	0.269	0.27	0.271	0.273	0.274	0.277	0.279	0.281	0.284	0.287	0.291	0.296	0.301
0.2	0.276	0.276	0.276	0.276	0.277	0.278	0.279	0.28	0.281	0.282	0.283	0.284	0.286	0.288	0.29	0.292	0.295	0.299	0.303	0.308

Table E.43 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a: Gamma(2,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.041	0.047	0.055	0.063	0.072	0.081	0.091	0.102	0.113	0.126	0.137	0.149	0.159	0.171	0.181	0.192	0.201	0.211	0.223	0.235
0.02	0.064	0.068	0.074	0.08	0.087	0.095	0.104	0.113	0.123	0.135	0.145	0.155	0.165	0.176	0.187	0.197	0.206	0.215	0.226	0.238
0.03	0.082	0.085	0.089	0.094	0.1	0.107	0.115	0.123	0.132	0.143	0.153	0.162	0.171	0.182	0.192	0.202	0.21	0.219	0.23	0.241
0.04	0.101	0.103	0.105	0.109	0.115	0.12	0.127	0.135	0.143	0.153	0.162	0.17	0.179	0.189	0.198	0.208	0.216	0.225	0.235	0.245
0.05	0.12	0.121	0.123	0.125	0.129	0.134	0.14	0.147	0.154	0.163	0.171	0.179	0.187	0.196	0.205	0.214	0.221	0.23	0.24	0.250
0.06	0.137	0.137	0.139	0.14	0.143	0.147	0.152	0.158	0.164	0.172	0.18	0.188	0.194	0.203	0.211	0.22	0.227	0.236	0.245	0.254
0.07	0.153	0.154	0.154	0.156	0.157	0.16	0.164	0.17	0.175	0.182	0.19	0.197	0.203	0.211	0.219	0.227	0.234	0.242	0.251	0.260
0.08	0.17	0.17	0.171	0.172	0.173	0.175	0.178	0.182	0.187	0.194	0.2	0.207	0.213	0.22	0.228	0.235	0.241	0.249	0.257	0.266
0.09	0.184	0.184	0.184	0.185	0.186	0.187	0.19	0.193	0.197	0.203	0.209	0.215	0.221	0.228	0.235	0.242	0.248	0.255	0.263	0.271
0.1	0.197	0.197	0.197	0.198	0.199	0.2	0.201	0.203	0.207	0.212	0.217	0.223	0.228	0.235	0.242	0.248	0.254	0.26	0.268	0.276
0.11	0.211	0.211	0.211	0.212	0.212	0.213	0.214	0.216	0.218	0.222	0.227	0.232	0.237	0.243	0.25	0.255	0.261	0.267	0.274	0.282
0.12	0.224	0.224	0.224	0.224	0.225	0.225	0.226	0.228	0.229	0.232	0.236	0.241	0.245	0.251	0.257	0.262	0.267	0.274	0.28	0.287
0.13	0.236	0.236	0.236	0.236	0.237	0.237	0.238	0.239	0.24	0.243	0.246	0.249	0.253	0.259	0.265	0.269	0.274	0.28	0.287	0.293
0.14	0.247	0.247	0.247	0.247	0.248	0.248	0.249	0.25	0.251	0.252	0.255	0.258	0.262	0.267	0.272	0.276	0.281	0.286	0.293	0.299
0.15	0.26	0.26	0.26	0.26	0.26	0.261	0.261	0.262	0.263	0.264	0.266	0.269	0.271	0.275	0.28	0.284	0.289	0.294	0.3	0.306
0.16	0.271	0.271	0.271	0.271	0.271	0.271	0.272	0.272	0.273	0.274	0.276	0.278	0.28	0.284	0.288	0.292	0.296	0.3	0.306	0.312
0.17	0.282	0.282	0.282	0.283	0.283	0.283	0.283	0.284	0.284	0.285	0.286	0.288	0.29	0.293	0.297	0.3	0.304	0.308	0.313	0.319
0.18	0.293	0.293	0.293	0.293	0.293	0.293	0.293	0.294	0.294	0.295	0.296	0.297	0.299	0.302	0.305	0.308	0.311	0.315	0.32	0.325
0.19	0.304	0.304	0.304	0.304	0.304	0.304	0.304	0.305	0.305	0.305	0.306	0.307	0.308	0.311	0.314	0.316	0.319	0.322	0.327	0.332
0.2	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.317	0.317	0.318	0.318	0.319	0.321	0.323	0.325	0.327	0.33	0.334	0.339

Table E.44 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a: Gamma(2,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.071	0.078	0.087	0.098	0.109	0.121	0.134	0.146	0.158	0.17	0.182	0.194	0.206	0.218	0.229	0.241	0.252	0.264	0.273	0.284
0.02	0.102	0.105	0.11	0.118	0.126	0.136	0.146	0.156	0.167	0.178	0.189	0.2	0.211	0.222	0.233	0.245	0.255	0.266	0.275	0.286
0.03	0.128	0.13	0.133	0.138	0.143	0.151	0.16	0.168	0.177	0.187	0.196	0.207	0.217	0.228	0.238	0.249	0.259	0.269	0.278	0.289
0.04	0.152	0.153	0.154	0.157	0.162	0.168	0.175	0.182	0.189	0.198	0.206	0.216	0.225	0.235	0.244	0.254	0.264	0.274	0.282	0.292
0.05	0.175	0.175	0.176	0.177	0.181	0.185	0.191	0.197	0.203	0.211	0.218	0.226	0.234	0.243	0.251	0.261	0.27	0.279	0.287	0.297
0.06	0.195	0.195	0.196	0.197	0.199	0.202	0.207	0.211	0.217	0.223	0.229	0.237	0.244	0.252	0.259	0.268	0.277	0.285	0.293	0.302
0.07	0.212	0.212	0.212	0.213	0.214	0.217	0.221	0.225	0.229	0.235	0.24	0.247	0.253	0.26	0.267	0.275	0.283	0.291	0.298	0.307
0.08	0.23	0.23	0.23	0.23	0.231	0.232	0.235	0.238	0.242	0.247	0.252	0.257	0.263	0.269	0.276	0.283	0.29	0.298	0.304	0.312
0.09	0.245	0.245	0.245	0.246	0.246	0.247	0.249	0.251	0.254	0.259	0.263	0.268	0.273	0.279	0.284	0.291	0.298	0.305	0.311	0.318
0.1	0.261	0.261	0.261	0.261	0.262	0.262	0.263	0.265	0.268	0.271	0.275	0.279	0.283	0.289	0.294	0.3	0.306	0.312	0.318	0.325
0.11	0.276	0.276	0.276	0.276	0.277	0.277	0.278	0.279	0.281	0.284	0.287	0.291	0.294	0.299	0.303	0.309	0.314	0.321	0.326	0.332
0.12	0.291	0.291	0.291	0.291	0.291	0.291	0.292	0.292	0.294	0.297	0.299	0.302	0.305	0.309	0.313	0.318	0.323	0.329	0.334	0.340
0.13	0.304	0.304	0.304	0.304	0.304	0.304	0.305	0.305	0.306	0.308	0.31	0.313	0.315	0.319	0.322	0.327	0.331	0.337	0.342	0.347
0.14	0.318	0.318	0.318	0.318	0.318	0.318	0.319	0.319	0.32	0.321	0.323	0.325	0.327	0.33	0.333	0.337	0.341	0.346	0.35	0.355
0.15	0.332	0.332	0.332	0.332	0.332	0.332	0.332	0.332	0.332	0.333	0.335	0.337	0.338	0.341	0.344	0.347	0.351	0.355	0.359	0.364
0.16	0.343	0.343	0.343	0.343	0.343	0.343	0.343	0.343	0.344	0.345	0.346	0.347	0.349	0.351	0.353	0.356	0.359	0.363	0.367	0.371
0.17	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.356	0.356	0.358	0.359	0.36	0.362	0.365	0.368	0.372	0.375	0.379
0.18	0.366	0.366	0.366	0.366	0.366	0.366	0.366	0.366	0.367	0.367	0.367	0.368	0.369	0.37	0.372	0.375	0.377	0.381	0.384	0.387
0.19	0.377	0.377	0.377	0.377	0.377	0.377	0.377	0.377	0.377	0.378	0.378	0.379	0.379	0.38	0.382	0.384	0.386	0.389	0.392	0.395
0.2	0.389	0.389	0.389	0.389	0.389	0.389	0.389	0.389	0.389	0.389	0.389	0.39	0.39	0.391	0.392	0.394	0.396	0.399	0.401	0.404

Table E.45 Power Study: Sequential Test, n = 5 - H_0 : Gamma(1,1); H_a: Gamma(3.5,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.015	0.02	0.024	0.029	0.035	0.041	0.046	0.053	0.059	0.064	0.071	0.078	0.085	0.091	0.098	0.106	0.112	0.12	0.127	0.134
0.02	0.028	0.032	0.036	0.041	0.047	0.053	0.059	0.065	0.071	0.076	0.083	0.09	0.097	0.103	0.111	0.118	0.124	0.132	0.139	0.146
0.03	0.04	0.044	0.047	0.052	0.058	0.064	0.07	0.076	0.082	0.088	0.094	0.101	0.108	0.114	0.122	0.129	0.136	0.144	0.15	0.158
0.04	0.054	0.058	0.061	0.065	0.07	0.076	0.082	0.088	0.094	0.1	0.106	0.113	0.12	0.126	0.134	0.141	0.148	0.156	0.162	0.170
0.05	0.067	0.071	0.073	0.077	0.082	0.087	0.093	0.099	0.105	0.111	0.118	0.125	0.132	0.138	0.145	0.152	0.159	0.167	0.174	0.181
0.06	0.079	0.083	0.085	0.089	0.093	0.098	0.103	0.11	0.116	0.121	0.128	0.135	0.142	0.148	0.155	0.163	0.169	0.177	0.184	0.191
0.07	0.092	0.095	0.098	0.102	0.106	0.111	0.115	0.121	0.127	0.133	0.139	0.146	0.153	0.159	0.167	0.174	0.181	0.189	0.195	0.203
0.08	0.103	0.107	0.11	0.114	0.117	0.122	0.126	0.131	0.137	0.142	0.149	0.156	0.163	0.169	0.177	0.184	0.191	0.198	0.205	0.212
0.09	0.114	0.118	0.121	0.125	0.129	0.133	0.138	0.142	0.147	0.152	0.159	0.166	0.173	0.179	0.186	0.193	0.2	0.208	0.215	0.222
0.1	0.126	0.13	0.133	0.137	0.14	0.145	0.149	0.154	0.158	0.162	0.169	0.176	0.183	0.189	0.196	0.203	0.21	0.218	0.225	0.232
0.11	0.137	0.141	0.144	0.148	0.152	0.156	0.161	0.165	0.169	0.173	0.178	0.185	0.191	0.197	0.205	0.212	0.219	0.227	0.233	0.240
0.12	0.148	0.151	0.154	0.158	0.162	0.166	0.17	0.175	0.179	0.182	0.187	0.193	0.199	0.205	0.212	0.219	0.226	0.233	0.24	0.247
0.13	0.157	0.161	0.163	0.167	0.171	0.175	0.179	0.183	0.187	0.191	0.196	0.201	0.206	0.211	0.218	0.225	0.232	0.24	0.246	0.253
0.14	0.168	0.171	0.173	0.177	0.18	0.185	0.189	0.193	0.197	0.201	0.205	0.21	0.215	0.219	0.226	0.232	0.239	0.247	0.253	0.260
0.15	0.178	0.18	0.183	0.186	0.189	0.194	0.198	0.202	0.206	0.209	0.214	0.218	0.223	0.227	0.233	0.239	0.245	0.253	0.259	0.266
0.16	0.189	0.191	0.193	0.196	0.199	0.203	0.207	0.211	0.215	0.219	0.223	0.227	0.232	0.235	0.24	0.246	0.251	0.258	0.265	0.272
0.17	0.198	0.2	0.202	0.205	0.208	0.212	0.215	0.219	0.223	0.227	0.231	0.235	0.239	0.243	0.248	0.252	0.258	0.264	0.27	0.277
0.18	0.208	0.21	0.212	0.215	0.217	0.221	0.225	0.228	0.232	0.236	0.24	0.244	0.248	0.252	0.256	0.26	0.265	0.271	0.276	0.283
0.19	0.218	0.22	0.222	0.225	0.227	0.231	0.234	0.238	0.241	0.245	0.249	0.253	0.257	0.26	0.265	0.269	0.273	0.278	0.284	0.290
0.2	0.227	0.23	0.231	0.234	0.236	0.239	0.243	0.246	0.25	0.253	0.257	0.261	0.265	0.268	0.273	0.276	0.28	0.285	0.29	0.296

Table E.46 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a: Gamma(3.5,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.061	0.067	0.073	0.079	0.086	0.093	0.101	0.109	0.116	0.126	0.135	0.144	0.153	0.162	0.171	0.18	0.189	0.199	0.208	0.217
0.02	0.092	0.097	0.102	0.107	0.114	0.12	0.127	0.134	0.141	0.149	0.158	0.166	0.174	0.182	0.19	0.199	0.207	0.216	0.225	0.234
0.03	0.117	0.12	0.124	0.129	0.135	0.141	0.147	0.153	0.16	0.168	0.176	0.183	0.191	0.199	0.206	0.214	0.222	0.23	0.239	0.247
0.04	0.138	0.141	0.144	0.148	0.153	0.159	0.165	0.17	0.176	0.184	0.191	0.198	0.206	0.213	0.22	0.227	0.235	0.243	0.251	0.259
0.05	0.16	0.162	0.165	0.168	0.172	0.177	0.183	0.188	0.194	0.2	0.207	0.214	0.22	0.227	0.234	0.241	0.248	0.256	0.263	0.271
0.06	0.178	0.181	0.183	0.185	0.189	0.193	0.198	0.203	0.208	0.214	0.221	0.227	0.233	0.239	0.245	0.252	0.259	0.266	0.273	0.280
0.07	0.197	0.199	0.201	0.203	0.206	0.21	0.214	0.218	0.223	0.228	0.234	0.24	0.246	0.251	0.257	0.263	0.27	0.277	0.284	0.290
0.08	0.215	0.216	0.218	0.22	0.223	0.225	0.229	0.232	0.237	0.242	0.248	0.253	0.258	0.264	0.269	0.275	0.281	0.288	0.294	0.301
0.09	0.233	0.234	0.235	0.237	0.239	0.241	0.244	0.247	0.251	0.255	0.26	0.265	0.27	0.276	0.281	0.286	0.292	0.298	0.304	0.310
0.1	0.248	0.249	0.25	0.251	0.253	0.255	0.257	0.259	0.263	0.267	0.271	0.276	0.281	0.285	0.29	0.296	0.301	0.307	0.313	0.319
0.11	0.263	0.264	0.265	0.266	0.268	0.269	0.271	0.273	0.275	0.279	0.283	0.287	0.291	0.296	0.3	0.306	0.311	0.317	0.322	0.328
0.12	0.277	0.277	0.278	0.279	0.28	0.282	0.283	0.285	0.287	0.29	0.293	0.297	0.301	0.305	0.31	0.314	0.319	0.325	0.33	0.335
0.13	0.293	0.293	0.294	0.294	0.295	0.296	0.298	0.299	0.301	0.303	0.306	0.309	0.313	0.317	0.321	0.325	0.33	0.335	0.34	0.345
0.14	0.306	0.306	0.307	0.307	0.308	0.309	0.31	0.312	0.313	0.315	0.317	0.32	0.323	0.327	0.33	0.335	0.339	0.344	0.349	0.354
0.15	0.32	0.32	0.321	0.321	0.322	0.323	0.324	0.325	0.326	0.328	0.33	0.332	0.335	0.338	0.341	0.345	0.349	0.354	0.358	0.363
0.16	0.333	0.333	0.334	0.334	0.335	0.335	0.336	0.337	0.339	0.34	0.341	0.343	0.345	0.348	0.351	0.355	0.359	0.363	0.367	0.371
0.17	0.345	0.346	0.346	0.346	0.347	0.347	0.348	0.349	0.35	0.351	0.353	0.354	0.356	0.358	0.361	0.364	0.368	0.372	0.376	0.380
0.18	0.358	0.358	0.358	0.358	0.359	0.359	0.36	0.361	0.362	0.363	0.364	0.366	0.367	0.369	0.371	0.374	0.377	0.381	0.384	0.388
0.19	0.371	0.371	0.371	0.372	0.372	0.372	0.373	0.373	0.375	0.375	0.376	0.378	0.379	0.38	0.382	0.385	0.388	0.391	0.394	0.397
0.2	0.382	0.382	0.382	0.382	0.383	0.383	0.383	0.384	0.385	0.386	0.387	0.388	0.389	0.39	0.392	0.394	0.396	0.399	0.402	0.406

Table E.47 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a: Gamma(3.5,1)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.103	0.107	0.114	0.121	0.129	0.138	0.148	0.157	0.168	0.18	0.19	0.201	0.212	0.223	0.234	0.245	0.255	0.266	0.277	0.289
	0.02	0.148	0.15	0.154	0.159	0.166	0.172	0.179	0.187	0.195	0.205	0.213	0.223	0.233	0.242	0.252	0.262	0.271	0.281	0.291	0.301
	0.03	0.179	0.18	0.183	0.187	0.192	0.197	0.203	0.21	0.216	0.225	0.232	0.241	0.249	0.257	0.266	0.275	0.284	0.293	0.302	0.312
	0.04	0.209	0.209	0.211	0.214	0.217	0.222	0.227	0.232	0.237	0.245	0.251	0.258	0.266	0.273	0.281	0.289	0.297	0.305	0.314	0.322
	0.05	0.236	0.237	0.238	0.239	0.242	0.245	0.249	0.254	0.258	0.264	0.27	0.276	0.282	0.289	0.296	0.304	0.311	0.319	0.326	0.334
	0.06	0.259	0.259	0.26	0.261	0.263	0.265	0.269	0.272	0.276	0.282	0.286	0.292	0.297	0.303	0.309	0.316	0.323	0.33	0.337	0.344
	0.07	0.282	0.282	0.282	0.283	0.284	0.286	0.289	0.292	0.295	0.3	0.304	0.309	0.313	0.319	0.324	0.331	0.337	0.343	0.35	0.356
	0.08	0.303	0.303	0.303	0.304	0.305	0.306	0.308	0.31	0.313	0.317	0.321	0.325	0.329	0.334	0.339	0.345	0.35	0.356	0.362	0.368
	0.09	0.322	0.322	0.322	0.322	0.323	0.324	0.325	0.327	0.329	0.333	0.336	0.34	0.343	0.347	0.352	0.357	0.362	0.368	0.373	0.379
	0.1	0.338	0.338	0.338	0.338	0.339	0.339	0.34	0.342	0.344	0.347	0.349	0.353	0.356	0.359	0.364	0.368	0.373	0.378	0.383	0.389
	0.11	0.354	0.354	0.354	0.355	0.355	0.355	0.356	0.357	0.358	0.361	0.363	0.366	0.369	0.372	0.376	0.38	0.385	0.389	0.394	0.399
	0.12	0.37	0.37	0.37	0.37	0.37	0.37	0.371	0.372	0.373	0.375	0.377	0.379	0.382	0.385	0.388	0.392	0.396	0.4	0.404	0.409
	0.13	0.385	0.385	0.385	0.385	0.385	0.386	0.386	0.387	0.387	0.389	0.391	0.393	0.395	0.397	0.401	0.404	0.408	0.411	0.415	0.419
	0.14	0.398	0.398	0.398	0.398	0.398	0.399	0.399	0.399	0.4	0.401	0.402	0.404	0.406	0.408	0.411	0.414	0.418	0.421	0.425	0.429
	0.15	0.412	0.412	0.412	0.412	0.412	0.412	0.412	0.412	0.413	0.414	0.415	0.416	0.418	0.42	0.423	0.425	0.428	0.432	0.435	0.439
	0.16	0.424	0.424	0.424	0.424	0.424	0.424	0.424	0.424	0.424	0.425	0.426	0.427	0.429	0.43	0.432	0.435	0.438	0.441	0.444	0.447
	0.17	0.436	0.436	0.436	0.436	0.436	0.436	0.436	0.436	0.436	0.437	0.437	0.438	0.44	0.441	0.443	0.445	0.447	0.45	0.453	0.456
	0.18	0.448	0.448	0.448	0.448	0.448	0.448	0.448	0.448	0.448	0.449	0.449	0.45	0.451	0.452	0.454	0.456	0.458	0.46	0.463	0.466
	0.19	0.459	0.459	0.459	0.459	0.459	0.459	0.459	0.459	0.46	0.46	0.46	0.461	0.461	0.462	0.463	0.465	0.467	0.47	0.472	0.475
	0.2	0.471	0.471	0.471	0.471	0.471	0.471	0.471	0.471	0.471	0.471	0.472	0.472	0.472	0.473	0.474	0.476	0.477	0.48	0.482	0.484

Table E.48 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a: Gamma(3.5,1)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.211	0.216	0.222	0.231	0.24	0.251	0.262	0.274	0.286	0.299	0.31	0.323	0.333	0.345	0.356	0.368	0.379	0.39	0.401	0.411
	0.02	0.276	0.277	0.28	0.284	0.289	0.296	0.304	0.312	0.321	0.33	0.338	0.348	0.356	0.366	0.375	0.385	0.394	0.404	0.413	0.423
	0.03	0.321	0.322	0.323	0.325	0.328	0.333	0.337	0.343	0.349	0.356	0.363	0.371	0.377	0.385	0.392	0.401	0.409	0.418	0.426	0.434
	0.04	0.357	0.357	0.358	0.359	0.361	0.363	0.367	0.371	0.376	0.381	0.386	0.392	0.397	0.403	0.41	0.417	0.424	0.431	0.438	0.446
	0.05	0.389	0.389	0.389	0.39	0.391	0.393	0.395	0.398	0.401	0.405	0.409	0.414	0.417	0.423	0.428	0.434	0.44	0.446	0.452	0.459
	0.06	0.418	0.418	0.418	0.418	0.419	0.42	0.421	0.424	0.426	0.429	0.432	0.436	0.439	0.443	0.447	0.452	0.457	0.463	0.468	0.473
	0.07	0.44	0.44	0.44	0.44	0.44	0.441	0.442	0.444	0.446	0.448	0.45	0.453	0.456	0.46	0.463	0.468	0.472	0.476	0.481	0.486
	0.08	0.46	0.46	0.46	0.46	0.46	0.461	0.462	0.463	0.465	0.467	0.469	0.471	0.474	0.476	0.479	0.483	0.487	0.491	0.494	0.499
	0.09	0.479	0.479	0.479	0.479	0.479	0.479	0.48	0.481	0.482	0.484	0.485	0.488	0.49	0.492	0.494	0.497	0.5	0.504	0.507	0.511
	0.1	0.496	0.496	0.496	0.496	0.496	0.496	0.497	0.498	0.499	0.5	0.501	0.503	0.505	0.507	0.509	0.511	0.514	0.517	0.52	0.523
	0.11	0.515	0.515	0.515	0.515	0.515	0.515	0.515	0.516	0.516	0.517	0.518	0.52	0.521	0.523	0.524	0.527	0.529	0.532	0.534	0.537
	0.12	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.531	0.531	0.532	0.533	0.534	0.535	0.536	0.538	0.54	0.542	0.544	0.546	0.549
	0.13	0.544	0.544	0.544	0.544	0.544	0.544	0.544	0.544	0.545	0.545	0.546	0.547	0.548	0.55	0.551	0.552	0.554	0.556	0.558	0.560
	0.14	0.557	0.557	0.557	0.557	0.557	0.557	0.557	0.557	0.558	0.558	0.559	0.56	0.56	0.562	0.563	0.564	0.566	0.567	0.569	0.571
	0.15	0.571	0.571	0.571	0.571	0.571	0.571	0.571	0.571	0.571	0.571	0.572	0.572	0.573	0.574	0.575	0.577	0.578	0.58	0.581	0.583
	0.16	0.583	0.583	0.583	0.583	0.583	0.583	0.583	0.583	0.583	0.584	0.584	0.585	0.585	0.586	0.587	0.588	0.59	0.591	0.592	0.594
	0.17	0.594	0.594	0.594	0.594	0.594	0.594	0.594	0.594	0.594	0.595	0.595	0.596	0.596	0.597	0.598	0.599	0.6	0.601	0.602	0.603
	0.18	0.604	0.604	0.604	0.604	0.604	0.604	0.604	0.604	0.604	0.605	0.605	0.605	0.606	0.606	0.607	0.608	0.609	0.61	0.611	0.612
	0.19	0.613	0.613	0.613	0.613	0.613	0.613	0.613	0.613	0.613	0.614	0.614	0.614	0.615	0.615	0.616	0.617	0.618	0.619	0.62	0.621
	0.2	0.624	0.624	0.624	0.624	0.624	0.624	0.624	0.624	0.624	0.624	0.624	0.625	0.625	0.625	0.626	0.627	0.628	0.628	0.629	0.630

Table E.49 Power Study: Sequential Test, n = 5 - H_0 : Gamma(1,1); H_a : $\chi^2(1)$

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.037	0.058	0.077	0.095	0.111	0.127	0.142	0.156	0.17	0.183	0.196	0.209	0.222	0.234	0.247	0.259	0.27	0.281	0.291	0.302
0.02	0.055	0.062	0.08	0.098	0.113	0.13	0.145	0.159	0.173	0.186	0.199	0.212	0.224	0.237	0.249	0.262	0.273	0.284	0.294	0.305
0.03	0.07	0.077	0.084	0.1	0.115	0.132	0.147	0.161	0.175	0.188	0.201	0.214	0.226	0.239	0.251	0.264	0.275	0.286	0.296	0.307
0.04	0.085	0.092	0.098	0.104	0.118	0.135	0.149	0.163	0.177	0.19	0.203	0.216	0.229	0.241	0.254	0.267	0.277	0.288	0.298	0.309
0.05	0.098	0.105	0.111	0.116	0.123	0.137	0.151	0.165	0.18	0.193	0.206	0.218	0.231	0.243	0.256	0.269	0.279	0.29	0.301	0.312
0.06	0.11	0.117	0.124	0.129	0.135	0.141	0.154	0.168	0.182	0.195	0.208	0.22	0.233	0.246	0.258	0.271	0.281	0.292	0.303	0.314
0.07	0.123	0.13	0.137	0.142	0.147	0.154	0.16	0.169	0.183	0.196	0.21	0.222	0.235	0.247	0.26	0.273	0.283	0.294	0.304	0.316
0.08	0.135	0.142	0.148	0.154	0.159	0.165	0.17	0.176	0.186	0.199	0.213	0.225	0.238	0.25	0.263	0.276	0.286	0.297	0.307	0.319
0.09	0.147	0.154	0.16	0.165	0.171	0.177	0.182	0.187	0.193	0.202	0.215	0.228	0.241	0.253	0.266	0.278	0.289	0.3	0.31	0.321
0.1	0.158	0.165	0.172	0.177	0.182	0.189	0.194	0.199	0.204	0.209	0.218	0.23	0.243	0.255	0.268	0.281	0.291	0.302	0.312	0.324
0.11	0.169	0.176	0.182	0.188	0.193	0.199	0.205	0.21	0.214	0.219	0.225	0.234	0.245	0.258	0.27	0.283	0.293	0.304	0.315	0.326
0.12	0.179	0.186	0.193	0.198	0.203	0.209	0.215	0.22	0.224	0.229	0.234	0.24	0.249	0.26	0.272	0.285	0.295	0.306	0.316	0.328
0.13	0.191	0.198	0.204	0.209	0.215	0.221	0.226	0.231	0.236	0.24	0.245	0.25	0.256	0.264	0.274	0.287	0.297	0.308	0.318	0.329
0.14	0.201	0.208	0.214	0.219	0.224	0.23	0.235	0.24	0.245	0.249	0.254	0.259	0.264	0.27	0.278	0.289	0.299	0.31	0.32	0.331
0.15	0.212	0.218	0.224	0.229	0.234	0.24	0.245	0.25	0.255	0.259	0.264	0.269	0.274	0.279	0.285	0.294	0.301	0.311	0.321	0.332
0.16	0.222	0.228	0.234	0.238	0.243	0.249	0.254	0.259	0.264	0.268	0.273	0.277	0.282	0.287	0.293	0.299	0.306	0.314	0.323	0.334
0.17	0.233	0.239	0.244	0.248	0.253	0.258	0.263	0.268	0.273	0.277	0.282	0.286	0.291	0.296	0.301	0.306	0.311	0.318	0.326	0.336
0.18	0.243	0.249	0.254	0.258	0.262	0.268	0.273	0.277	0.282	0.286	0.291	0.295	0.3	0.305	0.309	0.314	0.319	0.324	0.331	0.339
0.19	0.253	0.259	0.264	0.268	0.272	0.278	0.282	0.287	0.292	0.296	0.3	0.305	0.309	0.314	0.319	0.323	0.328	0.332	0.338	0.345
0.2	0.263	0.269	0.274	0.278	0.282	0.288	0.292	0.297	0.301	0.305	0.31	0.314	0.318	0.323	0.328	0.332	0.336	0.34	0.345	0.351

Table E.50 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a : $\chi^2(1)$

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.03	0.046	0.063	0.077	0.091	0.104	0.116	0.127	0.139	0.15	0.16	0.172	0.183	0.193	0.203	0.214	0.224	0.234	0.244	0.254
0.02	0.046	0.049	0.063	0.078	0.091	0.104	0.116	0.128	0.139	0.15	0.16	0.172	0.183	0.193	0.203	0.214	0.224	0.234	0.244	0.254
0.03	0.062	0.064	0.068	0.078	0.092	0.104	0.117	0.128	0.139	0.15	0.16	0.172	0.183	0.193	0.203	0.215	0.224	0.234	0.244	0.254
0.04	0.076	0.078	0.08	0.083	0.093	0.105	0.117	0.128	0.14	0.15	0.16	0.172	0.183	0.193	0.203	0.215	0.224	0.234	0.244	0.254
0.05	0.089	0.091	0.094	0.096	0.099	0.106	0.117	0.128	0.14	0.15	0.161	0.172	0.183	0.193	0.204	0.215	0.224	0.234	0.244	0.254
0.06	0.101	0.103	0.105	0.107	0.11	0.113	0.12	0.129	0.14	0.151	0.161	0.172	0.183	0.193	0.204	0.215	0.225	0.234	0.245	0.254
0.07	0.111	0.113	0.115	0.117	0.119	0.122	0.125	0.132	0.141	0.151	0.161	0.172	0.184	0.194	0.204	0.215	0.225	0.234	0.245	0.254
0.08	0.122	0.124	0.127	0.128	0.13	0.133	0.135	0.139	0.145	0.153	0.162	0.173	0.184	0.194	0.204	0.215	0.225	0.235	0.245	0.255
0.09	0.133	0.135	0.137	0.139	0.141	0.143	0.145	0.148	0.151	0.157	0.164	0.174	0.185	0.194	0.204	0.215	0.225	0.235	0.245	0.255
0.1	0.144	0.146	0.148	0.149	0.151	0.153	0.156	0.158	0.16	0.163	0.169	0.177	0.186	0.195	0.205	0.216	0.225	0.235	0.245	0.255
0.11	0.156	0.158	0.159	0.161	0.163	0.165	0.167	0.169	0.171	0.173	0.177	0.183	0.19	0.197	0.206	0.217	0.226	0.236	0.246	0.255
0.12	0.167	0.168	0.17	0.171	0.173	0.175	0.177	0.179	0.181	0.183	0.185	0.189	0.194	0.201	0.208	0.218	0.227	0.236	0.246	0.256
0.13	0.178	0.179	0.181	0.182	0.184	0.186	0.188	0.19	0.192	0.194	0.195	0.198	0.202	0.206	0.213	0.221	0.229	0.238	0.247	0.256
0.14	0.19	0.191	0.192	0.194	0.196	0.197	0.199	0.201	0.203	0.205	0.206	0.209	0.211	0.214	0.219	0.226	0.233	0.241	0.249	0.258
0.15	0.2	0.201	0.202	0.204	0.206	0.207	0.209	0.211	0.212	0.214	0.216	0.218	0.22	0.222	0.226	0.232	0.237	0.244	0.252	0.260
0.16	0.21	0.211	0.212	0.213	0.215	0.216	0.218	0.22	0.221	0.223	0.225	0.227	0.229	0.231	0.234	0.238	0.243	0.249	0.256	0.263
0.17	0.22	0.221	0.222	0.223	0.225	0.226	0.228	0.23	0.231	0.233	0.234	0.236	0.238	0.24	0.242	0.246	0.249	0.254	0.261	0.267
0.18	0.232	0.232	0.233	0.234	0.236	0.237	0.239	0.24	0.242	0.243	0.245	0.247	0.249	0.25	0.252	0.256	0.258	0.262	0.267	0.273
0.19	0.242	0.243	0.244	0.244	0.246	0.247	0.249	0.25	0.252	0.253	0.255	0.257	0.258	0.26	0.262	0.265	0.267	0.27	0.274	0.278
0.2	0.252	0.252	0.253	0.254	0.255	0.256	0.258	0.259	0.261	0.262	0.263	0.265	0.267	0.268	0.27	0.273	0.275	0.277	0.281	0.285

Table E.51 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); $H_a : \chi^2(1)$

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.032	0.048	0.064	0.077	0.091	0.103	0.115	0.127	0.139	0.152	0.163	0.175	0.185	0.196	0.207	0.218	0.229	0.24	0.252	0.263
	0.02	0.051	0.052	0.064	0.077	0.091	0.104	0.115	0.127	0.139	0.152	0.163	0.175	0.185	0.196	0.207	0.218	0.229	0.24	0.252	0.263
	0.03	0.069	0.07	0.072	0.079	0.091	0.104	0.115	0.127	0.139	0.152	0.163	0.175	0.185	0.196	0.207	0.218	0.229	0.24	0.252	0.263
	0.04	0.082	0.083	0.085	0.087	0.094	0.105	0.115	0.127	0.139	0.152	0.163	0.175	0.185	0.196	0.207	0.218	0.229	0.24	0.252	0.263
	0.05	0.096	0.097	0.098	0.1	0.102	0.108	0.117	0.128	0.139	0.153	0.163	0.175	0.185	0.196	0.207	0.218	0.229	0.24	0.252	0.263
	0.06	0.11	0.111	0.112	0.113	0.115	0.117	0.122	0.131	0.141	0.153	0.164	0.175	0.185	0.197	0.207	0.218	0.229	0.24	0.252	0.263
	0.07	0.122	0.123	0.124	0.126	0.127	0.128	0.131	0.136	0.144	0.155	0.165	0.176	0.186	0.197	0.207	0.219	0.229	0.24	0.252	0.263
	0.08	0.135	0.136	0.137	0.138	0.139	0.141	0.142	0.145	0.15	0.159	0.167	0.177	0.186	0.197	0.208	0.219	0.229	0.24	0.252	0.263
	0.09	0.148	0.149	0.15	0.151	0.152	0.153	0.155	0.156	0.159	0.165	0.172	0.181	0.189	0.199	0.208	0.219	0.229	0.24	0.252	0.263
	0.1	0.162	0.163	0.164	0.164	0.166	0.167	0.168	0.17	0.171	0.175	0.18	0.186	0.193	0.202	0.211	0.221	0.231	0.241	0.252	0.263
	0.11	0.175	0.175	0.176	0.177	0.178	0.179	0.18	0.182	0.183	0.186	0.189	0.193	0.199	0.207	0.215	0.224	0.233	0.242	0.253	0.263
	0.12	0.187	0.188	0.188	0.189	0.19	0.191	0.192	0.193	0.195	0.197	0.199	0.202	0.207	0.213	0.22	0.227	0.235	0.244	0.254	0.264
	0.13	0.199	0.199	0.2	0.2	0.201	0.202	0.203	0.204	0.206	0.208	0.209	0.212	0.215	0.22	0.226	0.232	0.239	0.247	0.257	0.266
	0.14	0.212	0.212	0.212	0.213	0.214	0.214	0.215	0.217	0.218	0.22	0.221	0.223	0.225	0.229	0.234	0.239	0.245	0.252	0.26	0.268
	0.15	0.223	0.224	0.224	0.224	0.225	0.226	0.227	0.228	0.229	0.231	0.232	0.234	0.236	0.238	0.242	0.246	0.251	0.257	0.264	0.272
	0.16	0.235	0.236	0.236	0.236	0.237	0.237	0.238	0.239	0.24	0.242	0.243	0.245	0.247	0.249	0.251	0.255	0.258	0.263	0.27	0.277
	0.17	0.247	0.247	0.247	0.247	0.248	0.248	0.249	0.25	0.251	0.253	0.254	0.255	0.257	0.259	0.261	0.264	0.267	0.271	0.276	0.282
	0.18	0.258	0.258	0.258	0.258	0.259	0.259	0.26	0.261	0.262	0.263	0.265	0.266	0.268	0.269	0.271	0.273	0.276	0.279	0.284	0.289
	0.19	0.269	0.269	0.269	0.269	0.27	0.27	0.271	0.272	0.273	0.274	0.275	0.276	0.278	0.279	0.281	0.283	0.285	0.287	0.292	0.296
	0.2	0.279	0.279	0.28	0.28	0.28	0.281	0.281	0.282	0.282	0.284	0.285	0.286	0.288	0.289	0.29	0.292	0.294	0.296	0.3	0.303

Table E.52 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); $H_a : \chi^2(1)$

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.032	0.046	0.062	0.079	0.092	0.108	0.123	0.136	0.149	0.163	0.176	0.189	0.2	0.213	0.224	0.235	0.245	0.258	0.268	0.279
	0.02	0.053	0.054	0.064	0.079	0.092	0.108	0.123	0.136	0.149	0.163	0.176	0.189	0.2	0.213	0.224	0.235	0.245	0.258	0.268	0.279
	0.03	0.075	0.075	0.076	0.084	0.094	0.108	0.123	0.136	0.149	0.163	0.176	0.189	0.2	0.213	0.224	0.235	0.245	0.258	0.268	0.279
	0.04	0.094	0.095	0.095	0.097	0.102	0.112	0.124	0.137	0.149	0.163	0.176	0.189	0.2	0.213	0.224	0.235	0.245	0.258	0.268	0.279
	0.05	0.111	0.112	0.112	0.113	0.115	0.12	0.128	0.139	0.15	0.164	0.176	0.189	0.2	0.213	0.224	0.235	0.245	0.258	0.268	0.279
	0.06	0.129	0.129	0.13	0.13	0.131	0.133	0.138	0.145	0.154	0.165	0.177	0.189	0.2	0.213	0.224	0.235	0.245	0.258	0.268	0.279
	0.07	0.145	0.145	0.146	0.146	0.147	0.148	0.15	0.155	0.161	0.169	0.179	0.19	0.201	0.213	0.224	0.235	0.245	0.258	0.268	0.279
	0.08	0.162	0.163	0.163	0.164	0.164	0.165	0.166	0.169	0.172	0.178	0.186	0.195	0.203	0.215	0.225	0.235	0.245	0.258	0.268	0.279
	0.09	0.177	0.177	0.178	0.178	0.179	0.18	0.18	0.182	0.184	0.188	0.194	0.201	0.208	0.217	0.227	0.236	0.246	0.258	0.268	0.279
	0.1	0.193	0.193	0.193	0.194	0.194	0.195	0.195	0.197	0.198	0.201	0.204	0.209	0.215	0.222	0.23	0.238	0.247	0.259	0.269	0.279
	0.11	0.206	0.206	0.207	0.207	0.208	0.208	0.209	0.21	0.211	0.212	0.215	0.219	0.222	0.228	0.235	0.242	0.25	0.261	0.27	0.280
	0.12	0.221	0.221	0.221	0.221	0.222	0.222	0.223	0.224	0.224	0.225	0.227	0.23	0.233	0.238	0.243	0.249	0.255	0.264	0.272	0.282
	0.13	0.235	0.235	0.236	0.236	0.236	0.237	0.237	0.238	0.239	0.24	0.241	0.243	0.245	0.248	0.253	0.257	0.262	0.27	0.277	0.285
	0.14	0.251	0.251	0.251	0.251	0.252	0.252	0.253	0.253	0.254	0.255	0.256	0.257	0.259	0.261	0.265	0.268	0.272	0.277	0.283	0.290
	0.15	0.264	0.264	0.264	0.264	0.264	0.265	0.265	0.266	0.266	0.267	0.268	0.269	0.27	0.272	0.275	0.277	0.28	0.285	0.29	0.296
	0.16	0.276	0.276	0.276	0.276	0.276	0.276	0.277	0.278	0.278	0.279	0.28	0.281	0.282	0.283	0.285	0.287	0.29	0.293	0.298	0.303
	0.17	0.288	0.288	0.288	0.289	0.289	0.289	0.289	0.29	0.29	0.291	0.292	0.293	0.294	0.295	0.297	0.299	0.3	0.304	0.307	0.311
	0.18	0.301	0.301	0.301	0.301	0.301	0.302	0.302	0.303	0.303	0.303	0.305	0.305	0.306	0.307	0.309	0.31	0.312	0.314	0.317	0.320
	0.19	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.314	0.314	0.315	0.316	0.317	0.317	0.319	0.32	0.321	0.322	0.325	0.327	0.330
	0.2	0.324	0.324	0.324	0.324	0.324	0.325	0.325	0.325	0.326	0.326	0.327	0.328	0.329	0.33	0.331	0.332	0.333	0.335	0.337	0.339

Table E.53 Power Study: Sequential Test, n = 5 - H_0 : Gamma(1,1); $H_a : \chi^2(4)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.014	0.02	0.026	0.033	0.039	0.046	0.053	0.06	0.067	0.074	0.082	0.089	0.097	0.104	0.113	0.121	0.129	0.136	0.144	0.153
0.02	0.025	0.029	0.035	0.042	0.048	0.055	0.062	0.069	0.076	0.083	0.091	0.098	0.106	0.114	0.122	0.13	0.138	0.146	0.153	0.162
0.03	0.036	0.04	0.044	0.051	0.057	0.063	0.07	0.078	0.085	0.092	0.099	0.106	0.114	0.122	0.13	0.138	0.146	0.154	0.162	0.170
0.04	0.046	0.05	0.054	0.059	0.065	0.072	0.079	0.086	0.093	0.1	0.108	0.115	0.123	0.131	0.139	0.147	0.155	0.163	0.171	0.179
0.05	0.057	0.06	0.065	0.069	0.074	0.081	0.088	0.095	0.102	0.109	0.117	0.124	0.132	0.139	0.148	0.156	0.164	0.171	0.179	0.187
0.06	0.067	0.071	0.075	0.08	0.085	0.089	0.096	0.103	0.11	0.117	0.125	0.132	0.14	0.147	0.156	0.164	0.172	0.18	0.187	0.196
0.07	0.079	0.083	0.087	0.091	0.096	0.1	0.105	0.111	0.118	0.125	0.133	0.14	0.148	0.156	0.164	0.172	0.18	0.188	0.196	0.204
0.08	0.089	0.093	0.097	0.102	0.106	0.11	0.115	0.12	0.126	0.133	0.141	0.148	0.156	0.164	0.172	0.18	0.188	0.196	0.204	0.212
0.09	0.1	0.104	0.108	0.113	0.117	0.121	0.125	0.13	0.135	0.141	0.149	0.156	0.164	0.172	0.18	0.188	0.196	0.204	0.212	0.220
0.1	0.111	0.115	0.119	0.124	0.129	0.133	0.137	0.142	0.146	0.151	0.157	0.164	0.172	0.18	0.188	0.196	0.204	0.212	0.22	0.228
0.11	0.122	0.125	0.13	0.134	0.139	0.143	0.147	0.152	0.156	0.16	0.166	0.172	0.18	0.187	0.196	0.204	0.211	0.219	0.227	0.235
0.12	0.132	0.136	0.14	0.144	0.148	0.152	0.157	0.161	0.166	0.17	0.174	0.179	0.186	0.193	0.202	0.21	0.217	0.225	0.233	0.241
0.13	0.141	0.145	0.148	0.153	0.157	0.161	0.165	0.17	0.174	0.178	0.182	0.187	0.193	0.199	0.207	0.215	0.222	0.23	0.238	0.246
0.14	0.15	0.153	0.157	0.161	0.165	0.169	0.173	0.178	0.182	0.186	0.19	0.195	0.2	0.205	0.212	0.22	0.227	0.235	0.243	0.251
0.15	0.16	0.163	0.166	0.171	0.174	0.178	0.182	0.187	0.191	0.194	0.199	0.203	0.208	0.213	0.219	0.225	0.232	0.24	0.247	0.255
0.16	0.17	0.172	0.175	0.179	0.183	0.186	0.19	0.194	0.198	0.202	0.206	0.211	0.215	0.22	0.226	0.231	0.237	0.245	0.252	0.260
0.17	0.179	0.182	0.185	0.188	0.192	0.195	0.199	0.203	0.207	0.211	0.215	0.219	0.224	0.228	0.233	0.238	0.244	0.25	0.257	0.264
0.18	0.187	0.19	0.193	0.196	0.199	0.202	0.206	0.21	0.214	0.218	0.222	0.226	0.231	0.235	0.24	0.244	0.249	0.255	0.261	0.269
0.19	0.197	0.199	0.202	0.205	0.209	0.212	0.215	0.219	0.223	0.226	0.23	0.234	0.239	0.243	0.248	0.252	0.256	0.261	0.267	0.274
0.2	0.206	0.209	0.212	0.215	0.218	0.221	0.224	0.228	0.231	0.235	0.239	0.243	0.247	0.251	0.256	0.26	0.264	0.269	0.274	0.280

Table E.54 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); $H_a : \chi^2(4)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.029	0.035	0.043	0.05	0.058	0.067	0.075	0.084	0.093	0.102	0.111	0.12	0.131	0.139	0.149	0.157	0.166	0.177	0.186	0.196
0.02	0.046	0.051	0.058	0.064	0.072	0.08	0.087	0.096	0.104	0.112	0.121	0.13	0.14	0.148	0.158	0.165	0.173	0.184	0.193	0.203
0.03	0.062	0.066	0.07	0.076	0.084	0.091	0.098	0.106	0.114	0.122	0.13	0.139	0.148	0.156	0.165	0.172	0.18	0.19	0.199	0.208
0.04	0.076	0.079	0.083	0.087	0.094	0.101	0.108	0.115	0.123	0.13	0.138	0.146	0.155	0.163	0.171	0.178	0.186	0.196	0.204	0.214
0.05	0.09	0.093	0.096	0.1	0.105	0.111	0.118	0.125	0.132	0.139	0.146	0.154	0.162	0.17	0.178	0.185	0.193	0.202	0.21	0.219
0.06	0.103	0.106	0.109	0.111	0.116	0.121	0.127	0.133	0.14	0.147	0.154	0.161	0.169	0.176	0.184	0.191	0.198	0.208	0.216	0.224
0.07	0.117	0.119	0.122	0.124	0.128	0.132	0.136	0.142	0.149	0.155	0.162	0.169	0.177	0.183	0.191	0.197	0.205	0.214	0.221	0.230
0.08	0.131	0.133	0.135	0.137	0.14	0.143	0.147	0.152	0.158	0.164	0.17	0.176	0.184	0.191	0.198	0.204	0.211	0.22	0.227	0.235
0.09	0.145	0.146	0.148	0.15	0.152	0.155	0.158	0.162	0.167	0.172	0.178	0.184	0.192	0.198	0.205	0.21	0.217	0.226	0.233	0.241
0.1	0.158	0.159	0.16	0.162	0.164	0.167	0.169	0.173	0.176	0.181	0.187	0.192	0.199	0.206	0.212	0.217	0.224	0.232	0.239	0.247
0.11	0.169	0.17	0.172	0.173	0.175	0.177	0.18	0.183	0.185	0.189	0.194	0.2	0.206	0.212	0.219	0.224	0.23	0.238	0.245	0.252
0.12	0.18	0.181	0.182	0.183	0.185	0.187	0.189	0.192	0.194	0.198	0.202	0.206	0.212	0.218	0.224	0.229	0.235	0.243	0.25	0.257
0.13	0.193	0.194	0.194	0.196	0.197	0.199	0.201	0.203	0.205	0.208	0.211	0.215	0.22	0.226	0.231	0.236	0.242	0.249	0.256	0.262
0.14	0.204	0.205	0.205	0.206	0.208	0.209	0.211	0.213	0.215	0.217	0.22	0.223	0.228	0.233	0.238	0.242	0.248	0.255	0.261	0.268
0.15	0.216	0.217	0.217	0.218	0.219	0.221	0.222	0.224	0.226	0.228	0.23	0.233	0.237	0.241	0.245	0.249	0.255	0.261	0.267	0.274
0.16	0.228	0.228	0.229	0.23	0.231	0.232	0.233	0.235	0.236	0.238	0.24	0.242	0.246	0.249	0.253	0.257	0.262	0.268	0.274	0.280
0.17	0.241	0.241	0.242	0.243	0.243	0.245	0.246	0.247	0.248	0.25	0.252	0.254	0.257	0.26	0.263	0.266	0.271	0.276	0.281	0.287
0.18	0.253	0.253	0.254	0.254	0.255	0.256	0.257	0.258	0.259	0.261	0.262	0.264	0.267	0.269	0.272	0.275	0.278	0.284	0.289	0.294
0.19	0.264	0.265	0.265	0.265	0.266	0.267	0.268	0.269	0.27	0.271	0.273	0.274	0.277	0.279	0.281	0.284	0.287	0.291	0.296	0.301
0.2	0.276	0.276	0.276	0.276	0.277	0.278	0.279	0.28	0.281	0.282	0.283	0.284	0.286	0.288	0.29	0.292	0.295	0.299	0.303	0.308

Table E.55 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a : $\chi^2(4)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.041	0.047	0.055	0.063	0.072	0.081	0.091	0.102	0.113	0.126	0.137	0.149	0.159	0.171	0.181	0.192	0.201	0.211	0.223	0.235
0.02	0.064	0.068	0.074	0.08	0.087	0.095	0.104	0.113	0.123	0.135	0.145	0.155	0.165	0.176	0.187	0.197	0.206	0.215	0.226	0.238
0.03	0.082	0.085	0.089	0.094	0.1	0.107	0.115	0.128	0.132	0.143	0.153	0.162	0.171	0.182	0.192	0.202	0.21	0.219	0.23	0.241
0.04	0.101	0.103	0.105	0.109	0.115	0.12	0.127	0.135	0.143	0.153	0.162	0.17	0.179	0.189	0.198	0.208	0.216	0.225	0.235	0.245
0.05	0.12	0.121	0.123	0.125	0.129	0.134	0.14	0.147	0.154	0.163	0.171	0.179	0.187	0.196	0.205	0.214	0.221	0.23	0.24	0.250
0.06	0.137	0.137	0.139	0.14	0.143	0.147	0.152	0.158	0.164	0.172	0.18	0.188	0.194	0.203	0.211	0.22	0.227	0.236	0.245	0.254
0.07	0.153	0.154	0.154	0.156	0.157	0.16	0.164	0.17	0.175	0.182	0.19	0.197	0.203	0.211	0.219	0.227	0.234	0.242	0.251	0.260
0.08	0.17	0.17	0.171	0.172	0.173	0.175	0.178	0.182	0.187	0.194	0.2	0.207	0.213	0.22	0.228	0.235	0.241	0.249	0.257	0.266
0.09	0.184	0.184	0.184	0.185	0.186	0.187	0.19	0.193	0.197	0.203	0.209	0.215	0.221	0.228	0.235	0.242	0.248	0.255	0.263	0.271
0.1	0.197	0.197	0.197	0.198	0.199	0.2	0.201	0.203	0.207	0.212	0.217	0.223	0.228	0.235	0.242	0.248	0.254	0.26	0.268	0.276
0.11	0.211	0.211	0.211	0.212	0.212	0.213	0.214	0.216	0.218	0.222	0.227	0.232	0.237	0.243	0.25	0.255	0.261	0.267	0.274	0.282
0.12	0.224	0.224	0.224	0.224	0.225	0.225	0.226	0.228	0.229	0.232	0.236	0.241	0.245	0.251	0.257	0.262	0.267	0.274	0.28	0.287
0.13	0.236	0.236	0.236	0.236	0.237	0.237	0.238	0.239	0.24	0.243	0.246	0.249	0.253	0.259	0.265	0.269	0.274	0.28	0.287	0.293
0.14	0.247	0.247	0.247	0.247	0.248	0.248	0.249	0.25	0.251	0.252	0.255	0.258	0.262	0.267	0.272	0.276	0.281	0.286	0.293	0.299
0.15	0.26	0.26	0.26	0.26	0.26	0.261	0.261	0.262	0.263	0.264	0.266	0.269	0.271	0.275	0.28	0.284	0.289	0.294	0.3	0.306
0.16	0.271	0.271	0.271	0.271	0.271	0.271	0.272	0.272	0.273	0.274	0.276	0.278	0.28	0.284	0.288	0.292	0.296	0.3	0.306	0.312
0.17	0.282	0.282	0.282	0.283	0.283	0.283	0.283	0.284	0.284	0.285	0.286	0.288	0.29	0.293	0.297	0.3	0.304	0.308	0.313	0.319
0.18	0.293	0.293	0.293	0.293	0.293	0.293	0.293	0.294	0.294	0.295	0.296	0.297	0.299	0.302	0.305	0.308	0.311	0.315	0.32	0.325
0.19	0.304	0.304	0.304	0.304	0.304	0.304	0.304	0.305	0.305	0.305	0.306	0.307	0.308	0.311	0.314	0.316	0.319	0.322	0.327	0.332
0.2	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.317	0.317	0.318	0.318	0.319	0.321	0.323	0.325	0.327	0.33	0.334	0.339

Table E.56 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a : $\chi^2(4)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.071	0.078	0.087	0.098	0.109	0.121	0.134	0.146	0.158	0.17	0.182	0.194	0.206	0.218	0.229	0.241	0.252	0.264	0.273	0.284
0.02	0.102	0.105	0.11	0.118	0.126	0.136	0.146	0.156	0.167	0.178	0.189	0.2	0.211	0.222	0.233	0.245	0.255	0.266	0.275	0.286
0.03	0.128	0.13	0.133	0.138	0.143	0.151	0.16	0.168	0.177	0.187	0.196	0.207	0.217	0.228	0.238	0.249	0.259	0.269	0.278	0.289
0.04	0.152	0.153	0.154	0.157	0.162	0.168	0.175	0.182	0.189	0.198	0.206	0.216	0.225	0.235	0.244	0.254	0.264	0.274	0.282	0.292
0.05	0.175	0.175	0.176	0.177	0.181	0.185	0.191	0.197	0.203	0.211	0.218	0.226	0.234	0.243	0.251	0.261	0.27	0.279	0.287	0.297
0.06	0.195	0.195	0.196	0.197	0.199	0.202	0.207	0.211	0.217	0.223	0.229	0.237	0.244	0.252	0.259	0.268	0.277	0.285	0.293	0.302
0.07	0.212	0.212	0.212	0.213	0.214	0.217	0.221	0.225	0.229	0.235	0.24	0.247	0.253	0.26	0.267	0.275	0.283	0.291	0.298	0.307
0.08	0.23	0.23	0.23	0.23	0.231	0.232	0.235	0.238	0.242	0.247	0.252	0.257	0.263	0.269	0.276	0.283	0.29	0.298	0.304	0.312
0.09	0.245	0.245	0.245	0.246	0.246	0.247	0.249	0.251	0.254	0.259	0.263	0.268	0.273	0.279	0.284	0.291	0.298	0.305	0.311	0.318
0.1	0.261	0.261	0.261	0.261	0.262	0.262	0.263	0.265	0.268	0.271	0.275	0.279	0.283	0.289	0.294	0.3	0.306	0.312	0.318	0.325
0.11	0.276	0.276	0.276	0.276	0.277	0.277	0.278	0.279	0.281	0.284	0.287	0.291	0.294	0.299	0.303	0.309	0.314	0.321	0.326	0.332
0.12	0.291	0.291	0.291	0.291	0.291	0.291	0.292	0.292	0.294	0.297	0.299	0.302	0.305	0.309	0.313	0.318	0.323	0.329	0.334	0.340
0.13	0.304	0.304	0.304	0.304	0.304	0.304	0.305	0.305	0.306	0.308	0.31	0.313	0.315	0.319	0.322	0.327	0.331	0.337	0.342	0.347
0.14	0.318	0.318	0.318	0.318	0.318	0.318	0.319	0.319	0.32	0.321	0.323	0.325	0.327	0.33	0.333	0.337	0.341	0.346	0.35	0.355
0.15	0.332	0.332	0.332	0.332	0.332	0.332	0.332	0.332	0.332	0.333	0.335	0.337	0.338	0.341	0.344	0.347	0.351	0.355	0.359	0.364
0.16	0.343	0.343	0.343	0.343	0.343	0.343	0.343	0.343	0.344	0.345	0.346	0.347	0.349	0.351	0.353	0.356	0.359	0.363	0.367	0.371
0.17	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.356	0.356	0.358	0.359	0.36	0.362	0.365	0.368	0.372	0.375	0.379
0.18	0.366	0.366	0.366	0.366	0.366	0.366	0.366	0.366	0.367	0.367	0.367	0.368	0.369	0.37	0.372	0.375	0.377	0.381	0.384	0.387
0.19	0.377	0.377	0.377	0.377	0.377	0.377	0.377	0.377	0.377	0.378	0.378	0.379	0.379	0.38	0.382	0.384	0.386	0.389	0.392	0.395
0.2	0.389	0.389	0.389	0.389	0.389	0.389	0.389	0.389	0.389	0.389	0.389	0.39	0.39	0.391	0.392	0.394	0.396	0.399	0.401	0.404

Table E.57 Power Study: Sequential Test, n = 5 - H_0 : Gamma(1,1); H_a: Lognorm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.023	0.037	0.052	0.067	0.08	0.093	0.106	0.119	0.131	0.143	0.154	0.166	0.177	0.188	0.199	0.21	0.219	0.231	0.241	0.251
0.02	0.037	0.042	0.056	0.07	0.084	0.097	0.11	0.123	0.135	0.147	0.158	0.17	0.181	0.192	0.203	0.213	0.223	0.234	0.244	0.254
0.03	0.051	0.055	0.06	0.074	0.088	0.101	0.114	0.126	0.139	0.15	0.162	0.174	0.185	0.195	0.207	0.217	0.227	0.238	0.248	0.258
0.04	0.065	0.069	0.074	0.079	0.091	0.105	0.117	0.13	0.142	0.154	0.165	0.177	0.188	0.199	0.21	0.221	0.23	0.242	0.252	0.262
0.05	0.079	0.083	0.088	0.093	0.097	0.109	0.122	0.135	0.147	0.158	0.17	0.182	0.193	0.204	0.215	0.225	0.235	0.246	0.256	0.266
0.06	0.092	0.096	0.1	0.105	0.109	0.115	0.126	0.139	0.151	0.163	0.174	0.186	0.197	0.208	0.219	0.23	0.239	0.251	0.261	0.271
0.07	0.104	0.109	0.113	0.118	0.122	0.127	0.133	0.143	0.155	0.167	0.178	0.19	0.201	0.212	0.223	0.234	0.243	0.255	0.265	0.275
0.08	0.115	0.12	0.124	0.129	0.133	0.138	0.142	0.149	0.159	0.17	0.182	0.194	0.205	0.216	0.227	0.237	0.247	0.258	0.268	0.278
0.09	0.128	0.133	0.137	0.142	0.146	0.151	0.155	0.16	0.166	0.175	0.186	0.198	0.209	0.22	0.231	0.242	0.251	0.263	0.273	0.283
0.1	0.14	0.144	0.149	0.154	0.158	0.163	0.167	0.172	0.176	0.182	0.191	0.202	0.213	0.224	0.235	0.246	0.255	0.267	0.277	0.287
0.11	0.152	0.157	0.161	0.166	0.17	0.175	0.179	0.184	0.189	0.193	0.198	0.207	0.217	0.228	0.239	0.249	0.259	0.27	0.28	0.290
0.12	0.162	0.166	0.171	0.175	0.18	0.184	0.189	0.194	0.198	0.202	0.206	0.212	0.221	0.23	0.242	0.252	0.262	0.273	0.283	0.293
0.13	0.173	0.177	0.181	0.186	0.19	0.195	0.199	0.204	0.208	0.212	0.216	0.221	0.226	0.234	0.244	0.254	0.264	0.275	0.285	0.295
0.14	0.183	0.187	0.191	0.196	0.2	0.204	0.209	0.213	0.218	0.221	0.225	0.23	0.234	0.24	0.248	0.257	0.266	0.277	0.287	0.297
0.15	0.194	0.198	0.202	0.206	0.21	0.214	0.219	0.223	0.227	0.231	0.235	0.239	0.244	0.248	0.254	0.261	0.269	0.28	0.29	0.300
0.16	0.204	0.207	0.211	0.215	0.219	0.223	0.227	0.232	0.236	0.24	0.244	0.248	0.252	0.256	0.261	0.266	0.273	0.283	0.292	0.302
0.17	0.215	0.218	0.222	0.226	0.229	0.234	0.238	0.242	0.246	0.25	0.253	0.258	0.262	0.265	0.27	0.274	0.28	0.288	0.296	0.305
0.18	0.225	0.229	0.232	0.236	0.239	0.243	0.247	0.252	0.256	0.259	0.263	0.267	0.271	0.275	0.279	0.283	0.287	0.294	0.301	0.308
0.19	0.236	0.239	0.243	0.246	0.249	0.253	0.257	0.262	0.265	0.269	0.273	0.276	0.281	0.284	0.288	0.291	0.296	0.301	0.307	0.314
0.2	0.246	0.249	0.253	0.256	0.259	0.263	0.267	0.271	0.275	0.278	0.282	0.286	0.29	0.293	0.297	0.3	0.304	0.309	0.314	0.319

Table E.58 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a: Lognorm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.061	0.083	0.104	0.12	0.135	0.148	0.162	0.174	0.187	0.201	0.213	0.224	0.235	0.245	0.255	0.266	0.276	0.286	0.296	0.307
0.02	0.086	0.088	0.105	0.121	0.136	0.149	0.162	0.175	0.188	0.201	0.214	0.224	0.236	0.246	0.256	0.267	0.277	0.286	0.297	0.307
0.03	0.106	0.108	0.111	0.122	0.137	0.15	0.163	0.176	0.189	0.202	0.214	0.225	0.237	0.246	0.256	0.267	0.277	0.287	0.297	0.307
0.04	0.122	0.123	0.125	0.129	0.14	0.152	0.165	0.178	0.19	0.203	0.216	0.226	0.238	0.247	0.257	0.268	0.278	0.288	0.298	0.308
0.05	0.137	0.139	0.141	0.142	0.146	0.154	0.166	0.179	0.191	0.204	0.217	0.227	0.238	0.248	0.258	0.269	0.278	0.288	0.298	0.308
0.06	0.151	0.153	0.154	0.156	0.158	0.162	0.17	0.18	0.192	0.205	0.218	0.228	0.239	0.249	0.259	0.27	0.279	0.289	0.299	0.309
0.07	0.164	0.165	0.167	0.168	0.17	0.172	0.176	0.184	0.194	0.206	0.218	0.229	0.24	0.25	0.26	0.27	0.28	0.289	0.299	0.310
0.08	0.177	0.178	0.18	0.181	0.183	0.185	0.187	0.191	0.199	0.209	0.221	0.23	0.241	0.251	0.26	0.271	0.281	0.29	0.3	0.310
0.09	0.191	0.192	0.193	0.194	0.196	0.197	0.199	0.202	0.206	0.214	0.223	0.232	0.243	0.252	0.261	0.272	0.281	0.291	0.301	0.311
0.1	0.204	0.205	0.206	0.207	0.209	0.21	0.212	0.214	0.216	0.221	0.227	0.235	0.245	0.253	0.262	0.273	0.282	0.291	0.301	0.311
0.11	0.216	0.217	0.218	0.219	0.221	0.222	0.223	0.225	0.227	0.23	0.234	0.24	0.248	0.256	0.264	0.274	0.283	0.292	0.302	0.312
0.12	0.229	0.229	0.23	0.231	0.233	0.234	0.235	0.237	0.239	0.241	0.243	0.248	0.254	0.26	0.267	0.277	0.285	0.294	0.304	0.313
0.13	0.241	0.242	0.243	0.243	0.245	0.246	0.247	0.248	0.25	0.252	0.254	0.257	0.261	0.266	0.272	0.28	0.288	0.297	0.306	0.315
0.14	0.252	0.252	0.253	0.254	0.255	0.256	0.257	0.259	0.26	0.262	0.263	0.265	0.268	0.271	0.277	0.284	0.291	0.299	0.308	0.317
0.15	0.263	0.263	0.264	0.264	0.265	0.266	0.267	0.269	0.27	0.272	0.273	0.275	0.277	0.279	0.283	0.289	0.295	0.303	0.311	0.319
0.16	0.274	0.274	0.275	0.276	0.276	0.277	0.278	0.279	0.281	0.282	0.283	0.285	0.287	0.289	0.291	0.296	0.301	0.308	0.315	0.323
0.17	0.285	0.286	0.286	0.287	0.288	0.288	0.289	0.29	0.291	0.293	0.294	0.295	0.297	0.299	0.301	0.304	0.309	0.314	0.32	0.327
0.18	0.297	0.297	0.298	0.298	0.299	0.3	0.3	0.301	0.302	0.304	0.305	0.306	0.308	0.309	0.311	0.313	0.317	0.321	0.326	0.332
0.19	0.308	0.308	0.309	0.309	0.309	0.31	0.311	0.312	0.313	0.314	0.315	0.316	0.318	0.319	0.32	0.323	0.326	0.329	0.333	0.338
0.2	0.318	0.318	0.319	0.319	0.32	0.32	0.321	0.322	0.323	0.324	0.325	0.326	0.327	0.328	0.33	0.332	0.334	0.337	0.34	0.345

Table E.59 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a: Lognorm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.087	0.108	0.129	0.147	0.164	0.18	0.195	0.208	0.222	0.237	0.249	0.262	0.274	0.287	0.3	0.311	0.322	0.334	0.345	0.355
0.02	0.115	0.116	0.13	0.147	0.164	0.18	0.195	0.208	0.222	0.237	0.249	0.262	0.274	0.287	0.3	0.311	0.323	0.334	0.345	0.355
0.03	0.139	0.139	0.141	0.152	0.166	0.181	0.195	0.208	0.222	0.237	0.249	0.263	0.274	0.287	0.3	0.312	0.323	0.334	0.345	0.355
0.04	0.157	0.158	0.159	0.161	0.17	0.183	0.197	0.209	0.223	0.238	0.25	0.263	0.275	0.287	0.3	0.312	0.323	0.334	0.345	0.355
0.05	0.176	0.176	0.177	0.178	0.181	0.189	0.2	0.212	0.224	0.239	0.25	0.263	0.275	0.287	0.3	0.312	0.323	0.334	0.345	0.356
0.06	0.195	0.195	0.196	0.197	0.198	0.2	0.207	0.216	0.228	0.241	0.252	0.264	0.275	0.288	0.301	0.312	0.323	0.335	0.345	0.356
0.07	0.21	0.21	0.211	0.212	0.212	0.213	0.217	0.223	0.232	0.244	0.254	0.266	0.277	0.288	0.301	0.312	0.323	0.335	0.346	0.356
0.08	0.227	0.227	0.227	0.228	0.229	0.23	0.231	0.235	0.24	0.25	0.259	0.269	0.279	0.29	0.302	0.313	0.324	0.335	0.346	0.356
0.09	0.242	0.242	0.243	0.243	0.244	0.245	0.246	0.247	0.251	0.258	0.265	0.273	0.282	0.293	0.304	0.314	0.324	0.335	0.346	0.357
0.1	0.259	0.259	0.259	0.26	0.26	0.261	0.262	0.263	0.265	0.269	0.274	0.281	0.288	0.297	0.307	0.317	0.326	0.336	0.347	0.357
0.11	0.273	0.274	0.274	0.274	0.275	0.275	0.276	0.277	0.278	0.281	0.284	0.289	0.295	0.303	0.311	0.32	0.329	0.338	0.348	0.357
0.12	0.286	0.286	0.286	0.287	0.287	0.287	0.288	0.289	0.29	0.292	0.294	0.298	0.303	0.309	0.316	0.324	0.332	0.341	0.35	0.359
0.13	0.299	0.299	0.299	0.299	0.3	0.3	0.301	0.301	0.302	0.304	0.305	0.308	0.311	0.316	0.323	0.33	0.337	0.345	0.353	0.362
0.14	0.311	0.311	0.311	0.312	0.312	0.312	0.313	0.313	0.314	0.315	0.316	0.318	0.321	0.324	0.33	0.336	0.342	0.349	0.357	0.364
0.15	0.323	0.323	0.323	0.324	0.324	0.324	0.325	0.325	0.326	0.327	0.328	0.329	0.331	0.334	0.338	0.343	0.348	0.355	0.361	0.368
0.16	0.335	0.335	0.335	0.335	0.335	0.336	0.336	0.337	0.337	0.339	0.339	0.34	0.342	0.344	0.347	0.351	0.355	0.36	0.366	0.373
0.17	0.346	0.346	0.346	0.346	0.346	0.347	0.347	0.348	0.348	0.349	0.35	0.351	0.352	0.353	0.356	0.359	0.362	0.367	0.372	0.377
0.18	0.357	0.357	0.357	0.357	0.357	0.357	0.358	0.358	0.359	0.36	0.36	0.361	0.362	0.363	0.365	0.367	0.37	0.374	0.378	0.384
0.19	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.369	0.369	0.37	0.371	0.371	0.372	0.373	0.375	0.376	0.379	0.382	0.385	0.390
0.2	0.378	0.378	0.378	0.378	0.378	0.379	0.379	0.379	0.38	0.38	0.381	0.381	0.382	0.383	0.384	0.386	0.388	0.39	0.393	0.397

Table E.60 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a: Lognorm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.134	0.159	0.189	0.215	0.237	0.259	0.28	0.297	0.314	0.331	0.347	0.361	0.373	0.387	0.4	0.411	0.421	0.434	0.444	0.454
0.02	0.179	0.181	0.195	0.216	0.237	0.259	0.28	0.297	0.314	0.331	0.347	0.361	0.373	0.387	0.4	0.411	0.421	0.434	0.444	0.454
0.03	0.216	0.216	0.218	0.228	0.242	0.261	0.28	0.297	0.314	0.331	0.347	0.361	0.373	0.387	0.4	0.411	0.421	0.434	0.444	0.454
0.04	0.246	0.247	0.247	0.249	0.256	0.268	0.283	0.298	0.315	0.331	0.347	0.361	0.373	0.387	0.4	0.411	0.421	0.434	0.444	0.454
0.05	0.27	0.27	0.271	0.271	0.273	0.28	0.291	0.302	0.316	0.332	0.348	0.361	0.373	0.387	0.4	0.411	0.421	0.434	0.444	0.454
0.06	0.294	0.294	0.294	0.294	0.295	0.298	0.304	0.311	0.322	0.335	0.349	0.361	0.374	0.387	0.4	0.411	0.421	0.434	0.444	0.454
0.07	0.316	0.316	0.316	0.316	0.317	0.318	0.321	0.325	0.333	0.342	0.353	0.364	0.375	0.388	0.4	0.411	0.421	0.434	0.444	0.454
0.08	0.336	0.337	0.337	0.337	0.337	0.338	0.339	0.341	0.346	0.352	0.36	0.369	0.378	0.389	0.401	0.412	0.422	0.434	0.444	0.454
0.09	0.355	0.355	0.355	0.355	0.355	0.355	0.356	0.357	0.36	0.364	0.37	0.376	0.384	0.393	0.403	0.413	0.423	0.434	0.444	0.454
0.1	0.371	0.371	0.371	0.371	0.371	0.372	0.372	0.373	0.374	0.377	0.381	0.386	0.392	0.399	0.408	0.416	0.425	0.435	0.445	0.455
0.11	0.387	0.387	0.387	0.387	0.387	0.388	0.388	0.388	0.389	0.391	0.393	0.397	0.401	0.407	0.414	0.421	0.428	0.438	0.447	0.456
0.12	0.403	0.403	0.403	0.403	0.403	0.403	0.403	0.404	0.404	0.405	0.407	0.409	0.412	0.416	0.422	0.427	0.433	0.442	0.449	0.458
0.13	0.417	0.417	0.417	0.417	0.417	0.417	0.417	0.418	0.418	0.419	0.42	0.421	0.424	0.427	0.431	0.435	0.44	0.447	0.453	0.461
0.14	0.431	0.431	0.431	0.431	0.431	0.431	0.431	0.432	0.432	0.432	0.433	0.434	0.436	0.438	0.44	0.444	0.448	0.453	0.459	0.466
0.15	0.443	0.443	0.443	0.443	0.443	0.443	0.444	0.444	0.444	0.444	0.445	0.446	0.447	0.448	0.45	0.453	0.456	0.46	0.465	0.471
0.16	0.454	0.454	0.454	0.454	0.454	0.454	0.454	0.454	0.455	0.455	0.455	0.456	0.457	0.458	0.46	0.462	0.464	0.468	0.472	0.476
0.17	0.465	0.465	0.465	0.465	0.465	0.465	0.466	0.466	0.466	0.466	0.466	0.467	0.468	0.469	0.47	0.472	0.474	0.476	0.48	0.484
0.18	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.479	0.479	0.479	0.479	0.48	0.481	0.482	0.483	0.485	0.487	0.489	0.493
0.19	0.489	0.489	0.489	0.489	0.489	0.489	0.489	0.489	0.489	0.489	0.489	0.49	0.49	0.491	0.492	0.493	0.494	0.496	0.498	0.501
0.2	0.499	0.499	0.499	0.499	0.499	0.499	0.499	0.499	0.499	0.499	0.499	0.5	0.5	0.501	0.501	0.502	0.503	0.505	0.506	0.509

Table E.61 Power Study: Sequential Test, n = 5 - H_0 : Gamma(1,1); H_a: XLogistic(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.131	0.164	0.191	0.215	0.235	0.253	0.27	0.285	0.301	0.315	0.329	0.342	0.353	0.364	0.375	0.386	0.396	0.406	0.417	0.427
0.02	0.163	0.169	0.193	0.217	0.238	0.255	0.273	0.288	0.303	0.318	0.331	0.344	0.355	0.366	0.377	0.388	0.398	0.408	0.42	0.429
0.03	0.187	0.193	0.198	0.218	0.239	0.256	0.274	0.289	0.305	0.319	0.333	0.345	0.356	0.368	0.378	0.389	0.399	0.41	0.421	0.431
0.04	0.207	0.213	0.218	0.223	0.24	0.258	0.276	0.29	0.306	0.32	0.334	0.347	0.358	0.369	0.38	0.391	0.401	0.411	0.422	0.432
0.05	0.227	0.232	0.237	0.241	0.246	0.26	0.278	0.292	0.308	0.323	0.336	0.349	0.36	0.371	0.382	0.393	0.403	0.413	0.424	0.434
0.06	0.243	0.249	0.253	0.258	0.261	0.266	0.279	0.294	0.31	0.324	0.338	0.35	0.362	0.373	0.384	0.395	0.405	0.415	0.426	0.436
0.07	0.259	0.264	0.269	0.273	0.277	0.281	0.286	0.296	0.311	0.326	0.339	0.352	0.363	0.374	0.385	0.396	0.406	0.416	0.428	0.437
0.08	0.271	0.277	0.282	0.286	0.29	0.294	0.298	0.303	0.313	0.327	0.341	0.354	0.365	0.376	0.387	0.398	0.408	0.418	0.429	0.439
0.09	0.285	0.291	0.295	0.299	0.303	0.307	0.312	0.315	0.321	0.329	0.343	0.355	0.366	0.378	0.389	0.4	0.409	0.42	0.431	0.441
0.1	0.298	0.304	0.309	0.313	0.317	0.321	0.325	0.329	0.333	0.338	0.346	0.357	0.369	0.38	0.391	0.402	0.412	0.422	0.433	0.443
0.11	0.311	0.316	0.321	0.325	0.329	0.333	0.337	0.341	0.345	0.348	0.353	0.361	0.37	0.381	0.392	0.403	0.413	0.423	0.434	0.444
0.12	0.321	0.327	0.332	0.336	0.34	0.344	0.348	0.352	0.356	0.359	0.362	0.367	0.373	0.383	0.393	0.404	0.414	0.425	0.436	0.445
0.13	0.332	0.337	0.342	0.346	0.35	0.354	0.358	0.362	0.366	0.369	0.372	0.376	0.38	0.386	0.395	0.405	0.415	0.426	0.437	0.446
0.14	0.342	0.347	0.351	0.355	0.359	0.363	0.367	0.371	0.375	0.378	0.381	0.385	0.388	0.393	0.399	0.407	0.416	0.427	0.438	0.447
0.15	0.352	0.357	0.361	0.365	0.369	0.373	0.377	0.381	0.385	0.388	0.391	0.394	0.398	0.402	0.406	0.412	0.419	0.428	0.439	0.448
0.16	0.362	0.367	0.371	0.375	0.378	0.382	0.386	0.39	0.394	0.397	0.4	0.403	0.407	0.41	0.414	0.418	0.423	0.43	0.44	0.450
0.17	0.372	0.377	0.38	0.384	0.387	0.391	0.395	0.399	0.403	0.406	0.409	0.412	0.415	0.419	0.422	0.425	0.429	0.435	0.443	0.451
0.18	0.382	0.387	0.39	0.394	0.397	0.401	0.405	0.408	0.412	0.415	0.418	0.422	0.425	0.428	0.431	0.434	0.438	0.442	0.448	0.455
0.19	0.391	0.396	0.4	0.403	0.406	0.41	0.414	0.417	0.421	0.424	0.427	0.43	0.433	0.437	0.44	0.443	0.446	0.449	0.454	0.459
0.2	0.4	0.405	0.409	0.412	0.415	0.419	0.423	0.426	0.43	0.433	0.436	0.439	0.442	0.445	0.448	0.451	0.454	0.457	0.461	0.465

Table E.62 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a: XLogistic(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.308	0.338	0.369	0.392	0.41	0.427	0.442	0.455	0.468	0.48	0.491	0.502	0.511	0.521	0.531	0.54	0.549	0.558	0.566	0.575
0.02	0.35	0.351	0.369	0.392	0.41	0.427	0.442	0.455	0.468	0.481	0.491	0.502	0.511	0.521	0.531	0.541	0.549	0.558	0.566	0.575
0.03	0.384	0.384	0.386	0.395	0.411	0.427	0.442	0.455	0.468	0.481	0.491	0.502	0.511	0.521	0.531	0.541	0.55	0.558	0.566	0.575
0.04	0.408	0.409	0.41	0.41	0.416	0.428	0.442	0.455	0.468	0.481	0.491	0.502	0.511	0.521	0.531	0.541	0.55	0.558	0.566	0.575
0.05	0.428	0.429	0.43	0.43	0.431	0.436	0.445	0.456	0.468	0.481	0.491	0.502	0.511	0.521	0.531	0.541	0.55	0.558	0.566	0.575
0.06	0.446	0.447	0.447	0.448	0.448	0.45	0.454	0.461	0.47	0.481	0.491	0.502	0.511	0.521	0.531	0.541	0.55	0.558	0.566	0.575
0.07	0.463	0.464	0.464	0.465	0.465	0.466	0.467	0.47	0.476	0.485	0.493	0.502	0.511	0.521	0.531	0.541	0.55	0.558	0.567	0.575
0.08	0.478	0.479	0.48	0.48	0.48	0.481	0.482	0.483	0.486	0.491	0.497	0.505	0.513	0.522	0.531	0.541	0.55	0.558	0.567	0.575
0.09	0.493	0.493	0.494	0.494	0.495	0.495	0.496	0.497	0.498	0.5	0.504	0.51	0.517	0.524	0.532	0.541	0.55	0.558	0.567	0.575
0.1	0.506	0.507	0.507	0.508	0.508	0.509	0.509	0.51	0.51	0.512	0.514	0.518	0.522	0.528	0.536	0.544	0.551	0.559	0.567	0.575
0.11	0.52	0.52	0.521	0.521	0.521	0.522	0.522	0.523	0.523	0.524	0.525	0.527	0.53	0.535	0.541	0.548	0.554	0.561	0.569	0.576
0.12	0.533	0.533	0.534	0.534	0.534	0.535	0.535	0.536	0.536	0.537	0.538	0.539	0.541	0.544	0.548	0.554	0.559	0.565	0.572	0.579
0.13	0.546	0.546	0.547	0.547	0.548	0.548	0.549	0.549	0.549	0.55	0.551	0.551	0.553	0.555	0.558	0.561	0.566	0.571	0.576	0.583
0.14	0.558	0.558	0.558	0.559	0.559	0.56	0.56	0.561	0.561	0.562	0.562	0.563	0.563	0.565	0.567	0.57	0.574	0.577	0.582	0.587
0.15	0.571	0.571	0.572	0.572	0.572	0.573	0.573	0.574	0.574	0.575	0.575	0.576	0.576	0.577	0.578	0.58	0.583	0.586	0.59	0.594
0.16	0.584	0.584	0.585	0.585	0.585	0.586	0.586	0.587	0.587	0.588	0.588	0.588	0.589	0.59	0.591	0.592	0.594	0.596	0.599	0.602
0.17	0.596	0.597	0.597	0.597	0.598	0.598	0.598	0.599	0.599	0.6	0.6	0.601	0.601	0.602	0.602	0.603	0.605	0.606	0.608	0.611
0.18	0.608	0.608	0.609	0.609	0.609	0.61	0.61	0.61	0.611	0.611	0.612	0.612	0.612	0.613	0.614	0.614	0.615	0.617	0.618	0.620
0.19	0.619	0.619	0.619	0.62	0.62	0.62	0.621	0.621	0.621	0.622	0.622	0.623	0.623	0.624	0.624	0.625	0.626	0.626	0.628	0.629
0.2	0.629	0.63	0.63	0.63	0.63	0.631	0.631	0.631	0.632	0.632	0.633	0.633	0.633	0.634	0.634	0.635	0.636	0.636	0.637	0.639

Table E.63 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a: XLogistic(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.418	0.441	0.469	0.493	0.515	0.534	0.551	0.568	0.585	0.605	0.62	0.635	0.647	0.659	0.671	0.681	0.691	0.7	0.709	0.717
0.02	0.474	0.474	0.481	0.497	0.516	0.534	0.551	0.568	0.585	0.605	0.62	0.635	0.647	0.659	0.671	0.681	0.691	0.7	0.709	0.717
0.03	0.516	0.516	0.517	0.52	0.53	0.542	0.555	0.57	0.585	0.605	0.62	0.635	0.647	0.659	0.671	0.681	0.691	0.7	0.709	0.717
0.04	0.549	0.549	0.549	0.549	0.552	0.557	0.566	0.578	0.591	0.606	0.62	0.635	0.647	0.659	0.671	0.681	0.691	0.7	0.709	0.717
0.05	0.577	0.577	0.577	0.578	0.578	0.58	0.584	0.592	0.601	0.613	0.623	0.635	0.647	0.659	0.671	0.681	0.691	0.7	0.709	0.717
0.06	0.602	0.602	0.602	0.602	0.602	0.602	0.604	0.608	0.613	0.622	0.63	0.639	0.648	0.659	0.671	0.681	0.691	0.7	0.709	0.717
0.07	0.623	0.623	0.623	0.623	0.623	0.623	0.624	0.625	0.628	0.633	0.639	0.645	0.652	0.662	0.671	0.681	0.691	0.7	0.709	0.717
0.08	0.64	0.64	0.641	0.641	0.641	0.641	0.641	0.642	0.643	0.646	0.649	0.654	0.659	0.666	0.674	0.682	0.691	0.7	0.709	0.717
0.09	0.656	0.656	0.656	0.656	0.657	0.657	0.657	0.657	0.658	0.659	0.661	0.664	0.668	0.673	0.68	0.686	0.693	0.7	0.709	0.717
0.1	0.673	0.673	0.673	0.673	0.673	0.673	0.673	0.673	0.674	0.674	0.675	0.677	0.679	0.684	0.688	0.693	0.698	0.704	0.71	0.717
0.11	0.687	0.687	0.687	0.687	0.687	0.687	0.687	0.687	0.688	0.688	0.688	0.689	0.691	0.693	0.697	0.7	0.704	0.709	0.714	0.719
0.12	0.699	0.699	0.699	0.699	0.699	0.699	0.699	0.699	0.699	0.7	0.7	0.7	0.701	0.703	0.705	0.708	0.711	0.715	0.719	0.723
0.13	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.711	0.711	0.711	0.711	0.712	0.713	0.714	0.716	0.718	0.722	0.725	0.728
0.14	0.72	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.722	0.722	0.722	0.723	0.724	0.725	0.727	0.729	0.731	0.734
0.15	0.732	0.732	0.732	0.732	0.732	0.732	0.732	0.732	0.732	0.732	0.733	0.733	0.733	0.733	0.734	0.735	0.736	0.737	0.739	0.742
0.16	0.741	0.741	0.741	0.741	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.743	0.743	0.744	0.745	0.746	0.747	0.749
0.17	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.751	0.751	0.751	0.751	0.751	0.751	0.752	0.752	0.753	0.754	0.756
0.18	0.758	0.758	0.758	0.758	0.759	0.759	0.759	0.759	0.759	0.759	0.759	0.759	0.759	0.76	0.76	0.76	0.761	0.761	0.762	0.763
0.19	0.766	0.766	0.766	0.766	0.766	0.766	0.767	0.767	0.767	0.767	0.767	0.767	0.767	0.767	0.768	0.768	0.768	0.769	0.769	0.770
0.2	0.774	0.774	0.774	0.774	0.774	0.774	0.774	0.774	0.774	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.776	0.776	0.776	0.777

Table E.64 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a: XLogistic(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.641	0.651	0.678	0.71	0.734	0.756	0.775	0.79	0.805	0.819	0.829	0.838	0.846	0.854	0.86	0.867	0.872	0.879	0.884	0.889
0.02	0.712	0.712	0.715	0.724	0.738	0.757	0.775	0.79	0.805	0.819	0.829	0.838	0.846	0.854	0.86	0.867	0.872	0.879	0.884	0.889
0.03	0.758	0.758	0.758	0.759	0.763	0.769	0.779	0.791	0.805	0.819	0.829	0.838	0.846	0.854	0.86	0.867	0.872	0.879	0.884	0.889
0.04	0.788	0.788	0.788	0.788	0.789	0.791	0.794	0.801	0.809	0.82	0.83	0.838	0.846	0.854	0.86	0.867	0.872	0.879	0.884	0.889
0.05	0.81	0.81	0.811	0.811	0.811	0.811	0.812	0.815	0.819	0.826	0.832	0.839	0.846	0.854	0.86	0.867	0.872	0.879	0.884	0.889
0.06	0.829	0.829	0.829	0.829	0.829	0.829	0.83	0.831	0.832	0.835	0.839	0.844	0.849	0.855	0.861	0.867	0.872	0.879	0.884	0.889
0.07	0.845	0.845	0.845	0.845	0.845	0.845	0.845	0.845	0.846	0.847	0.849	0.852	0.855	0.86	0.864	0.869	0.873	0.879	0.885	0.889
0.08	0.858	0.858	0.858	0.858	0.858	0.859	0.859	0.859	0.859	0.859	0.86	0.862	0.864	0.866	0.869	0.872	0.876	0.881	0.885	0.890
0.09	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.871	0.872	0.873	0.875	0.877	0.879	0.883	0.887	0.890
0.1	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.88	0.881	0.882	0.883	0.885	0.887	0.89	0.893
0.11	0.887	0.887	0.887	0.887	0.887	0.887	0.887	0.887	0.887	0.887	0.887	0.887	0.887	0.888	0.889	0.889	0.89	0.892	0.894	0.896
0.12	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.895	0.896	0.896	0.897	0.898	0.899	0.900
0.13	0.901	0.901	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.903	0.903	0.904	0.904	0.905
0.14	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.909	0.909	0.909	0.910
0.15	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.915	0.915
0.16	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919
0.17	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923
0.18	0.927	0.927	0.927	0.927	0.927	0.927	0.927	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928
0.19	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.932	0.932	0.932
0.2	0.934	0.934	0.934	0.934	0.934	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935

Table E.65 Power Study: Sequential Test, n = 5 - H_0 : Gamam(1,1); H_a: Xdouble-Exp.

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.1	0.126	0.148	0.168	0.185	0.2	0.214	0.227	0.242	0.253	0.266	0.276	0.287	0.298	0.308	0.319	0.329	0.339	0.348	0.357
0.02	0.127	0.132	0.152	0.172	0.189	0.204	0.218	0.231	0.246	0.258	0.27	0.28	0.291	0.302	0.312	0.323	0.333	0.343	0.352	0.361
0.03	0.149	0.153	0.158	0.175	0.192	0.208	0.222	0.235	0.249	0.261	0.273	0.284	0.295	0.306	0.316	0.327	0.336	0.346	0.356	0.365
0.04	0.168	0.173	0.177	0.181	0.196	0.212	0.226	0.239	0.253	0.265	0.277	0.288	0.299	0.31	0.32	0.331	0.34	0.35	0.36	0.369
0.05	0.187	0.191	0.196	0.199	0.203	0.216	0.229	0.243	0.257	0.269	0.281	0.292	0.303	0.314	0.324	0.335	0.344	0.354	0.364	0.373
0.06	0.203	0.208	0.212	0.215	0.218	0.222	0.233	0.247	0.261	0.273	0.285	0.296	0.307	0.318	0.328	0.339	0.348	0.358	0.368	0.377
0.07	0.217	0.222	0.226	0.229	0.232	0.236	0.24	0.25	0.265	0.276	0.288	0.299	0.31	0.321	0.331	0.342	0.352	0.362	0.371	0.380
0.08	0.232	0.236	0.24	0.244	0.247	0.25	0.254	0.258	0.269	0.28	0.292	0.303	0.314	0.325	0.335	0.346	0.355	0.365	0.375	0.384
0.09	0.245	0.25	0.254	0.257	0.26	0.263	0.267	0.271	0.276	0.284	0.296	0.307	0.318	0.329	0.339	0.35	0.359	0.369	0.379	0.388
0.1	0.258	0.262	0.266	0.27	0.272	0.276	0.279	0.283	0.286	0.291	0.3	0.31	0.321	0.332	0.342	0.353	0.362	0.372	0.382	0.391
0.11	0.271	0.275	0.279	0.283	0.286	0.289	0.293	0.296	0.299	0.302	0.307	0.315	0.325	0.336	0.346	0.356	0.366	0.376	0.385	0.394
0.12	0.281	0.286	0.29	0.293	0.296	0.299	0.303	0.306	0.31	0.312	0.316	0.321	0.328	0.338	0.348	0.359	0.369	0.378	0.388	0.397
0.13	0.293	0.297	0.301	0.304	0.307	0.31	0.314	0.317	0.321	0.323	0.326	0.33	0.335	0.342	0.35	0.361	0.371	0.38	0.39	0.399
0.14	0.303	0.307	0.311	0.314	0.317	0.32	0.324	0.327	0.33	0.333	0.336	0.339	0.343	0.348	0.354	0.363	0.372	0.382	0.392	0.401
0.15	0.315	0.319	0.322	0.325	0.328	0.331	0.335	0.338	0.341	0.344	0.347	0.35	0.353	0.356	0.361	0.368	0.376	0.385	0.394	0.403
0.16	0.325	0.328	0.332	0.335	0.337	0.34	0.344	0.347	0.35	0.353	0.356	0.359	0.362	0.365	0.369	0.375	0.38	0.388	0.397	0.406
0.17	0.335	0.338	0.342	0.344	0.347	0.35	0.353	0.356	0.36	0.362	0.365	0.368	0.371	0.374	0.378	0.382	0.386	0.393	0.4	0.408
0.18	0.345	0.348	0.351	0.354	0.357	0.359	0.363	0.366	0.369	0.371	0.374	0.377	0.38	0.383	0.387	0.39	0.394	0.398	0.405	0.411
0.19	0.355	0.359	0.362	0.365	0.367	0.37	0.373	0.376	0.379	0.381	0.384	0.387	0.39	0.393	0.396	0.4	0.403	0.407	0.411	0.417
0.2	0.365	0.368	0.372	0.374	0.377	0.379	0.382	0.385	0.388	0.391	0.393	0.396	0.399	0.402	0.405	0.408	0.411	0.415	0.419	0.423

Table E.66 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a: Xdouble-Exp.

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.287	0.317	0.346	0.368	0.386	0.402	0.416	0.43	0.442	0.454	0.466	0.476	0.487	0.496	0.504	0.514	0.523	0.532	0.54	0.549
0.02	0.327	0.329	0.348	0.369	0.388	0.403	0.417	0.431	0.443	0.455	0.466	0.477	0.488	0.497	0.505	0.514	0.523	0.532	0.541	0.549
0.03	0.359	0.359	0.362	0.373	0.389	0.404	0.418	0.432	0.444	0.456	0.467	0.478	0.489	0.498	0.506	0.515	0.524	0.533	0.541	0.550
0.04	0.382	0.383	0.384	0.386	0.394	0.406	0.419	0.433	0.445	0.457	0.468	0.479	0.489	0.498	0.506	0.516	0.525	0.533	0.542	0.550
0.05	0.403	0.403	0.404	0.404	0.407	0.413	0.422	0.434	0.446	0.457	0.469	0.479	0.49	0.499	0.507	0.516	0.525	0.534	0.542	0.551
0.06	0.42	0.42	0.421	0.421	0.422	0.424	0.429	0.438	0.448	0.458	0.469	0.48	0.49	0.499	0.507	0.517	0.526	0.534	0.543	0.551
0.07	0.436	0.437	0.437	0.438	0.438	0.439	0.441	0.446	0.453	0.462	0.471	0.481	0.491	0.5	0.508	0.517	0.526	0.535	0.543	0.552
0.08	0.451	0.451	0.452	0.452	0.453	0.454	0.454	0.457	0.461	0.467	0.475	0.483	0.492	0.501	0.508	0.518	0.526	0.535	0.543	0.552
0.09	0.465	0.465	0.465	0.466	0.466	0.467	0.468	0.469	0.471	0.475	0.481	0.488	0.496	0.504	0.511	0.519	0.527	0.536	0.544	0.553
0.1	0.479	0.479	0.48	0.48	0.481	0.481	0.482	0.482	0.483	0.486	0.49	0.494	0.501	0.507	0.513	0.521	0.529	0.537	0.545	0.553
0.11	0.493	0.493	0.493	0.494	0.494	0.495	0.495	0.496	0.496	0.498	0.5	0.503	0.507	0.513	0.518	0.525	0.532	0.539	0.547	0.555
0.12	0.505	0.505	0.505	0.505	0.506	0.506	0.507	0.507	0.508	0.508	0.51	0.512	0.515	0.519	0.524	0.529	0.536	0.543	0.549	0.557
0.13	0.518	0.518	0.518	0.519	0.519	0.52	0.52	0.52	0.521	0.521	0.522	0.523	0.526	0.529	0.532	0.536	0.542	0.548	0.553	0.560
0.14	0.529	0.53	0.53	0.53	0.53	0.531	0.531	0.531	0.532	0.532	0.533	0.534	0.535	0.538	0.54	0.544	0.548	0.553	0.558	0.565
0.15	0.541	0.542	0.542	0.542	0.542	0.543	0.543	0.543	0.544	0.544	0.545	0.545	0.546	0.548	0.55	0.553	0.556	0.561	0.565	0.570
0.16	0.554	0.554	0.554	0.554	0.555	0.555	0.555	0.556	0.556	0.556	0.557	0.557	0.558	0.559	0.561	0.563	0.566	0.569	0.573	0.577
0.17	0.566	0.566	0.566	0.566	0.567	0.567	0.567	0.568	0.568	0.568	0.569	0.569	0.57	0.57	0.572	0.573	0.575	0.578	0.581	0.585
0.18	0.578	0.578	0.578	0.578	0.579	0.579	0.579	0.58	0.58	0.58	0.58	0.581	0.581	0.582	0.583	0.584	0.585	0.588	0.59	0.593
0.19	0.589	0.589	0.589	0.589	0.589	0.59	0.59	0.59	0.59	0.591	0.591	0.591	0.592	0.592	0.593	0.594	0.595	0.597	0.598	0.601
0.2	0.598	0.599	0.599	0.599	0.599	0.599	0.599	0.6	0.6	0.6	0.6	0.601	0.601	0.601	0.602	0.603	0.604	0.605	0.607	0.609

Table E.67 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a: Xdouble-Exp.

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.401	0.424	0.453	0.476	0.496	0.516	0.531	0.549	0.566	0.584	0.598	0.613	0.625	0.638	0.648	0.658	0.667	0.677	0.685	0.693
	0.02	0.453	0.453	0.463	0.479	0.497	0.516	0.532	0.549	0.566	0.584	0.598	0.613	0.625	0.638	0.649	0.658	0.667	0.677	0.685	0.693
	0.03	0.493	0.493	0.494	0.499	0.509	0.523	0.535	0.55	0.566	0.584	0.598	0.614	0.625	0.638	0.649	0.658	0.667	0.677	0.685	0.693
	0.04	0.524	0.524	0.524	0.525	0.528	0.537	0.546	0.557	0.571	0.585	0.598	0.614	0.625	0.638	0.649	0.658	0.667	0.677	0.685	0.693
	0.05	0.55	0.551	0.551	0.551	0.552	0.555	0.561	0.569	0.579	0.591	0.602	0.614	0.625	0.638	0.649	0.659	0.667	0.677	0.685	0.693
	0.06	0.573	0.573	0.573	0.573	0.573	0.574	0.577	0.582	0.589	0.598	0.607	0.616	0.626	0.638	0.649	0.659	0.667	0.677	0.685	0.693
	0.07	0.594	0.594	0.594	0.594	0.595	0.595	0.596	0.598	0.603	0.609	0.615	0.623	0.631	0.64	0.649	0.659	0.668	0.677	0.686	0.693
	0.08	0.612	0.612	0.612	0.612	0.612	0.612	0.613	0.614	0.616	0.621	0.625	0.631	0.637	0.644	0.652	0.66	0.668	0.678	0.686	0.693
	0.09	0.627	0.627	0.627	0.627	0.627	0.628	0.628	0.628	0.63	0.632	0.635	0.639	0.644	0.65	0.656	0.663	0.669	0.678	0.686	0.694
	0.1	0.644	0.644	0.644	0.644	0.644	0.644	0.645	0.645	0.646	0.647	0.648	0.651	0.654	0.659	0.663	0.669	0.674	0.681	0.687	0.694
	0.11	0.657	0.657	0.658	0.658	0.658	0.658	0.658	0.658	0.658	0.659	0.66	0.662	0.664	0.667	0.671	0.675	0.679	0.685	0.69	0.696
	0.12	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.671	0.671	0.672	0.674	0.676	0.679	0.682	0.686	0.69	0.694	0.699
	0.13	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.681	0.681	0.681	0.681	0.683	0.684	0.686	0.689	0.692	0.696	0.699	0.704
	0.14	0.691	0.691	0.691	0.691	0.691	0.691	0.691	0.691	0.692	0.692	0.692	0.692	0.693	0.694	0.695	0.698	0.7	0.703	0.706	0.709
	0.15	0.701	0.701	0.701	0.701	0.701	0.701	0.701	0.701	0.701	0.701	0.702	0.702	0.702	0.703	0.704	0.705	0.707	0.709	0.712	0.715
	0.16	0.709	0.709	0.709	0.709	0.709	0.709	0.709	0.71	0.71	0.71	0.71	0.71	0.71	0.711	0.712	0.713	0.714	0.716	0.718	0.720
	0.17	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.719	0.719	0.719	0.719	0.72	0.721	0.721	0.723	0.725	0.727
	0.18	0.727	0.727	0.727	0.727	0.727	0.727	0.727	0.727	0.727	0.727	0.727	0.727	0.727	0.728	0.728	0.728	0.729	0.73	0.732	0.733
	0.19	0.734	0.734	0.734	0.734	0.734	0.734	0.734	0.734	0.734	0.734	0.734	0.734	0.735	0.735	0.735	0.735	0.736	0.737	0.738	0.739
	0.2	0.741	0.741	0.741	0.741	0.741	0.741	0.741	0.741	0.741	0.741	0.742	0.742	0.742	0.742	0.742	0.742	0.743	0.744	0.744	0.745

Table E.68 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a: Xdouble-Exp.

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.625	0.636	0.664	0.694	0.719	0.741	0.76	0.774	0.788	0.802	0.814	0.823	0.831	0.839	0.846	0.852	0.859	0.864	0.87	0.875
	0.02	0.692	0.692	0.696	0.707	0.722	0.742	0.76	0.774	0.788	0.802	0.814	0.823	0.831	0.839	0.846	0.852	0.859	0.864	0.87	0.875
	0.03	0.737	0.737	0.737	0.739	0.744	0.752	0.764	0.775	0.789	0.802	0.814	0.823	0.831	0.839	0.846	0.852	0.859	0.864	0.87	0.875
	0.04	0.767	0.767	0.767	0.768	0.769	0.772	0.777	0.782	0.792	0.803	0.814	0.823	0.831	0.839	0.846	0.852	0.859	0.864	0.87	0.875
	0.05	0.789	0.789	0.789	0.789	0.789	0.79	0.793	0.796	0.801	0.808	0.817	0.824	0.832	0.839	0.846	0.852	0.859	0.864	0.87	0.875
	0.06	0.807	0.807	0.807	0.807	0.807	0.808	0.809	0.81	0.813	0.817	0.822	0.827	0.833	0.84	0.846	0.852	0.859	0.864	0.87	0.875
	0.07	0.824	0.824	0.824	0.824	0.824	0.824	0.824	0.825	0.826	0.828	0.831	0.834	0.838	0.843	0.848	0.854	0.859	0.865	0.87	0.875
	0.08	0.838	0.838	0.838	0.838	0.838	0.838	0.838	0.838	0.838	0.839	0.841	0.843	0.845	0.848	0.852	0.857	0.861	0.866	0.871	0.875
	0.09	0.848	0.848	0.848	0.848	0.848	0.848	0.848	0.848	0.848	0.849	0.85	0.851	0.853	0.854	0.857	0.86	0.864	0.868	0.872	0.876
	0.1	0.857	0.857	0.857	0.857	0.857	0.857	0.857	0.857	0.858	0.858	0.858	0.859	0.86	0.862	0.863	0.866	0.869	0.872	0.875	0.878
	0.11	0.866	0.866	0.866	0.866	0.866	0.866	0.866	0.866	0.866	0.866	0.867	0.867	0.868	0.869	0.87	0.871	0.873	0.875	0.878	0.880
	0.12	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.875	0.875	0.875	0.875	0.876	0.876	0.877	0.878	0.879	0.88	0.882	0.884
	0.13	0.881	0.881	0.881	0.881	0.881	0.881	0.881	0.881	0.881	0.881	0.881	0.881	0.882	0.882	0.883	0.883	0.884	0.885	0.886	0.888
	0.14	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.889	0.889	0.889	0.89	0.89	0.891	0.892
	0.15	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.894	0.895	0.895	0.895	0.895	0.896	0.896	0.897
	0.16	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.9	0.9	0.9	0.9	0.9	0.9	0.901	0.901
	0.17	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.905	0.905
	0.18	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.908	0.909	0.909	0.909	0.909	0.909
	0.19	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.912	0.913	0.913	0.913	0.913	0.913
	0.2	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.917	0.917	0.917	0.917

Table E.69 Power Study: Sequential Test, n = 5 - H_0 : Gamam(1,1); H_a: XCauchy(0,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.347	0.372	0.393	0.408	0.423	0.436	0.449	0.459	0.47	0.48	0.49	0.498	0.506	0.515	0.523	0.531	0.538	0.545	0.552	0.558
0.02	0.372	0.376	0.395	0.411	0.426	0.439	0.451	0.462	0.473	0.483	0.492	0.501	0.509	0.518	0.525	0.534	0.54	0.547	0.554	0.560
0.03	0.392	0.395	0.399	0.413	0.428	0.441	0.453	0.464	0.475	0.485	0.494	0.503	0.511	0.52	0.527	0.536	0.542	0.549	0.556	0.562
0.04	0.408	0.412	0.415	0.418	0.43	0.443	0.455	0.466	0.477	0.487	0.496	0.505	0.513	0.522	0.529	0.538	0.544	0.551	0.558	0.564
0.05	0.422	0.426	0.429	0.432	0.435	0.445	0.458	0.468	0.479	0.489	0.499	0.507	0.515	0.524	0.532	0.54	0.547	0.554	0.56	0.566
0.06	0.436	0.439	0.443	0.445	0.448	0.451	0.46	0.47	0.481	0.491	0.501	0.509	0.517	0.526	0.534	0.542	0.549	0.556	0.562	0.569
0.07	0.448	0.452	0.455	0.457	0.46	0.462	0.465	0.472	0.483	0.493	0.502	0.511	0.519	0.528	0.535	0.544	0.55	0.557	0.564	0.570
0.08	0.458	0.461	0.465	0.467	0.469	0.472	0.475	0.478	0.485	0.495	0.504	0.513	0.521	0.53	0.537	0.546	0.552	0.559	0.566	0.572
0.09	0.468	0.472	0.475	0.478	0.48	0.482	0.485	0.487	0.491	0.497	0.506	0.514	0.522	0.531	0.539	0.547	0.554	0.561	0.568	0.574
0.1	0.478	0.482	0.485	0.487	0.49	0.492	0.495	0.497	0.5	0.503	0.509	0.517	0.525	0.534	0.541	0.55	0.556	0.563	0.57	0.576
0.11	0.487	0.491	0.494	0.497	0.499	0.501	0.504	0.506	0.509	0.511	0.515	0.52	0.526	0.535	0.543	0.551	0.558	0.565	0.572	0.578
0.12	0.495	0.499	0.502	0.505	0.507	0.509	0.512	0.514	0.517	0.519	0.522	0.525	0.53	0.537	0.544	0.553	0.559	0.566	0.573	0.579
0.13	0.503	0.506	0.509	0.512	0.514	0.517	0.519	0.521	0.524	0.526	0.529	0.532	0.535	0.54	0.546	0.554	0.561	0.568	0.574	0.580
0.14	0.51	0.513	0.516	0.519	0.521	0.523	0.526	0.528	0.531	0.533	0.536	0.538	0.541	0.545	0.549	0.555	0.562	0.569	0.575	0.581
0.15	0.519	0.522	0.525	0.527	0.529	0.532	0.534	0.536	0.539	0.541	0.544	0.546	0.549	0.552	0.555	0.559	0.564	0.57	0.577	0.583
0.16	0.526	0.529	0.532	0.534	0.536	0.538	0.541	0.543	0.546	0.548	0.55	0.553	0.555	0.558	0.56	0.563	0.567	0.572	0.578	0.584
0.17	0.533	0.536	0.538	0.541	0.543	0.545	0.547	0.549	0.552	0.554	0.557	0.559	0.561	0.564	0.566	0.569	0.572	0.575	0.58	0.585
0.18	0.54	0.543	0.546	0.548	0.549	0.552	0.554	0.556	0.559	0.561	0.563	0.566	0.568	0.571	0.573	0.575	0.577	0.58	0.584	0.588
0.19	0.547	0.55	0.552	0.554	0.556	0.558	0.56	0.562	0.565	0.567	0.57	0.572	0.574	0.577	0.579	0.581	0.583	0.586	0.589	0.592
0.2	0.553	0.556	0.558	0.56	0.562	0.564	0.566	0.568	0.571	0.573	0.575	0.578	0.58	0.582	0.584	0.586	0.588	0.591	0.593	0.596

Table E.70 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1,1); H_a: XCauchy(0,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.692	0.706	0.722	0.733	0.741	0.749	0.756	0.763	0.769	0.774	0.779	0.784	0.79	0.794	0.799	0.803	0.807	0.81	0.814	0.819
0.02	0.715	0.716	0.722	0.733	0.742	0.749	0.756	0.763	0.769	0.774	0.779	0.785	0.79	0.795	0.799	0.803	0.807	0.811	0.814	0.819
0.03	0.732	0.732	0.733	0.736	0.742	0.749	0.756	0.763	0.769	0.775	0.779	0.785	0.79	0.795	0.799	0.803	0.807	0.811	0.815	0.819
0.04	0.744	0.744	0.745	0.745	0.748	0.751	0.756	0.763	0.769	0.775	0.779	0.785	0.79	0.795	0.799	0.803	0.807	0.811	0.815	0.819
0.05	0.754	0.755	0.755	0.755	0.756	0.757	0.76	0.765	0.769	0.775	0.78	0.785	0.79	0.795	0.799	0.803	0.807	0.811	0.815	0.819
0.06	0.762	0.763	0.763	0.763	0.763	0.764	0.766	0.768	0.772	0.776	0.78	0.785	0.79	0.795	0.799	0.803	0.807	0.811	0.815	0.819
0.07	0.771	0.771	0.772	0.772	0.772	0.772	0.773	0.774	0.776	0.779	0.782	0.786	0.79	0.795	0.799	0.803	0.807	0.811	0.815	0.819
0.08	0.779	0.779	0.779	0.779	0.78	0.78	0.78	0.781	0.782	0.784	0.786	0.789	0.793	0.796	0.799	0.803	0.807	0.811	0.815	0.819
0.09	0.787	0.787	0.787	0.787	0.787	0.787	0.788	0.788	0.789	0.79	0.791	0.793	0.796	0.799	0.802	0.805	0.807	0.811	0.815	0.819
0.1	0.794	0.794	0.794	0.794	0.794	0.794	0.795	0.795	0.795	0.796	0.797	0.798	0.8	0.803	0.805	0.807	0.81	0.812	0.816	0.819
0.11	0.801	0.801	0.801	0.801	0.801	0.802	0.802	0.802	0.802	0.803	0.803	0.804	0.805	0.807	0.809	0.811	0.813	0.816	0.819	0.822
0.12	0.808	0.808	0.808	0.808	0.808	0.809	0.809	0.809	0.809	0.809	0.81	0.81	0.811	0.813	0.814	0.816	0.818	0.82	0.822	0.825
0.13	0.815	0.815	0.815	0.815	0.815	0.816	0.816	0.816	0.816	0.816	0.817	0.817	0.818	0.819	0.82	0.821	0.823	0.825	0.826	0.829
0.14	0.822	0.822	0.822	0.822	0.822	0.822	0.822	0.822	0.823	0.823	0.823	0.823	0.824	0.824	0.825	0.827	0.828	0.829	0.831	0.833
0.15	0.829	0.829	0.829	0.829	0.829	0.83	0.83	0.83	0.83	0.83	0.83	0.831	0.831	0.831	0.832	0.833	0.834	0.835	0.837	0.838
0.16	0.837	0.837	0.837	0.837	0.837	0.837	0.837	0.837	0.838	0.838	0.838	0.838	0.838	0.839	0.839	0.84	0.841	0.842	0.843	0.844
0.17	0.842	0.842	0.842	0.842	0.842	0.842	0.842	0.842	0.842	0.843	0.843	0.843	0.843	0.844	0.844	0.845	0.845	0.846	0.847	0.848
0.18	0.846	0.846	0.846	0.846	0.846	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.848	0.848	0.849	0.849	0.85	0.85	0.851
0.19	0.851	0.851	0.851	0.851	0.851	0.851	0.851	0.851	0.851	0.851	0.852	0.852	0.852	0.852	0.852	0.853	0.853	0.854	0.854	0.855
0.2	0.854	0.854	0.854	0.854	0.854	0.855	0.855	0.855	0.855	0.855	0.855	0.855	0.856	0.856	0.856	0.856	0.857	0.857	0.857	0.858

Table E.71 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1,1); H_a: XCauchy(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.822	0.826	0.835	0.844	0.853	0.861	0.868	0.876	0.884	0.894	0.898	0.902	0.905	0.908	0.91	0.913	0.915	0.917	0.918	0.920
0.02	0.846	0.846	0.848	0.851	0.855	0.861	0.868	0.876	0.884	0.894	0.898	0.902	0.905	0.908	0.91	0.913	0.915	0.917	0.918	0.920
0.03	0.869	0.869	0.869	0.87	0.871	0.874	0.877	0.881	0.886	0.894	0.898	0.902	0.905	0.908	0.91	0.913	0.915	0.917	0.918	0.920
0.04	0.882	0.882	0.882	0.882	0.883	0.884	0.886	0.888	0.891	0.895	0.898	0.902	0.905	0.908	0.91	0.913	0.915	0.917	0.918	0.920
0.05	0.89	0.89	0.89	0.89	0.891	0.891	0.892	0.893	0.895	0.898	0.899	0.902	0.905	0.908	0.91	0.913	0.915	0.917	0.918	0.920
0.06	0.897	0.897	0.897	0.897	0.897	0.897	0.897	0.898	0.899	0.901	0.902	0.904	0.905	0.908	0.91	0.913	0.915	0.917	0.918	0.920
0.07	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.903	0.904	0.905	0.906	0.907	0.909	0.911	0.913	0.915	0.917	0.918	0.920
0.08	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.907	0.907	0.908	0.908	0.909	0.91	0.911	0.912	0.914	0.915	0.917	0.918	0.920
0.09	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.911	0.911	0.912	0.913	0.914	0.915	0.916	0.917	0.919	0.920
0.1	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.914	0.914	0.914	0.915	0.915	0.916	0.916	0.917	0.918	0.919	0.921
0.11	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.916	0.917	0.917	0.917	0.917	0.918	0.918	0.919	0.92	0.921	0.922
0.12	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.92	0.92	0.92	0.921	0.921	0.922	0.923
0.13	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.922	0.922	0.922	0.922	0.922	0.923	0.923	0.924	0.924
0.14	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.925	0.925	0.925	0.926
0.15	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.927	0.927	0.927	0.928
0.16	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.929	0.929
0.17	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.93	0.93	0.93	0.93	0.93	0.930
0.18	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.932	0.932
0.19	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.933	0.933
0.2	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.934	0.934	0.934	0.934

Table E.72 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1,1); H_a: XCauchy(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.918	0.919	0.92	0.922	0.924	0.926	0.928	0.928	0.929	0.929	0.93	0.931	0.931	0.931	0.931	0.932	0.932	0.932	0.932	0.933
0.02	0.925	0.925	0.925	0.925	0.926	0.927	0.928	0.928	0.929	0.929	0.93	0.931	0.931	0.931	0.931	0.932	0.932	0.932	0.932	0.933
0.03	0.927	0.927	0.927	0.928	0.928	0.928	0.928	0.929	0.929	0.929	0.93	0.931	0.931	0.931	0.931	0.932	0.932	0.932	0.932	0.933
0.04	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.93	0.93	0.93	0.931	0.931	0.931	0.931	0.932	0.932	0.932	0.932	0.933
0.05	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.931	0.931	0.931	0.931	0.931	0.932	0.932	0.932	0.932	0.933
0.06	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.932	0.932	0.932	0.932	0.933
0.07	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.931	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.933
0.08	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.933	0.933
0.09	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.933	0.933	0.933	0.933
0.1	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933
0.11	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933
0.12	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933
0.13	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933
0.14	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933
0.15	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.934
0.16	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934
0.17	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934
0.18	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934
0.19	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934
0.2	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934

E.3 H_0: Gamma (β = 1.5)

Table E.73 Power Study: Sequential Test, n = 5 - H_0 : Gamma(1.5,1); H_a : $\chi^2(4)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.016	0.024	0.033	0.042	0.051	0.059	0.068	0.077	0.086	0.093	0.103	0.112	0.121	0.13	0.139	0.147	0.156	0.165	0.173	0.182
0.02	0.026	0.031	0.039	0.049	0.057	0.065	0.074	0.083	0.092	0.1	0.109	0.119	0.128	0.136	0.145	0.154	0.162	0.171	0.179	0.188
0.03	0.035	0.04	0.046	0.055	0.063	0.071	0.08	0.089	0.098	0.106	0.115	0.125	0.134	0.142	0.151	0.159	0.168	0.177	0.185	0.194
0.04	0.046	0.051	0.056	0.062	0.069	0.078	0.087	0.095	0.105	0.112	0.122	0.131	0.14	0.149	0.158	0.166	0.175	0.184	0.192	0.201
0.05	0.056	0.061	0.067	0.072	0.077	0.084	0.093	0.102	0.111	0.119	0.128	0.137	0.147	0.155	0.164	0.172	0.181	0.19	0.198	0.207
0.06	0.067	0.071	0.077	0.082	0.087	0.092	0.1	0.108	0.117	0.125	0.134	0.144	0.153	0.161	0.17	0.179	0.187	0.196	0.204	0.213
0.07	0.076	0.081	0.087	0.092	0.096	0.101	0.107	0.114	0.123	0.131	0.141	0.15	0.159	0.168	0.176	0.185	0.193	0.203	0.21	0.220
0.08	0.087	0.091	0.097	0.102	0.107	0.111	0.117	0.122	0.13	0.137	0.147	0.156	0.165	0.174	0.183	0.191	0.2	0.209	0.217	0.226
0.09	0.097	0.101	0.107	0.112	0.117	0.121	0.127	0.131	0.138	0.144	0.153	0.162	0.171	0.18	0.189	0.197	0.206	0.215	0.223	0.232
0.1	0.107	0.111	0.117	0.122	0.127	0.132	0.137	0.141	0.147	0.152	0.16	0.168	0.177	0.186	0.195	0.203	0.212	0.221	0.229	0.238
0.11	0.117	0.121	0.127	0.132	0.137	0.141	0.147	0.151	0.156	0.161	0.167	0.175	0.183	0.191	0.2	0.209	0.217	0.226	0.234	0.243
0.12	0.126	0.131	0.137	0.141	0.146	0.151	0.156	0.161	0.166	0.17	0.175	0.182	0.189	0.197	0.206	0.214	0.223	0.232	0.24	0.249
0.13	0.136	0.141	0.146	0.151	0.156	0.161	0.166	0.17	0.176	0.18	0.185	0.191	0.197	0.204	0.212	0.22	0.229	0.238	0.246	0.255
0.14	0.146	0.151	0.156	0.161	0.166	0.171	0.176	0.18	0.186	0.19	0.195	0.2	0.206	0.212	0.219	0.227	0.235	0.244	0.252	0.261
0.15	0.157	0.162	0.167	0.172	0.177	0.182	0.187	0.191	0.196	0.201	0.205	0.211	0.217	0.222	0.228	0.234	0.241	0.25	0.257	0.266
0.16	0.167	0.171	0.177	0.182	0.186	0.191	0.196	0.2	0.205	0.209	0.214	0.219	0.225	0.229	0.235	0.241	0.248	0.255	0.262	0.271
0.17	0.176	0.18	0.186	0.191	0.195	0.199	0.204	0.209	0.214	0.218	0.223	0.228	0.233	0.237	0.243	0.248	0.254	0.261	0.268	0.276
0.18	0.185	0.19	0.195	0.199	0.204	0.208	0.213	0.218	0.223	0.226	0.231	0.236	0.242	0.246	0.251	0.256	0.262	0.268	0.274	0.282
0.19	0.195	0.199	0.204	0.208	0.212	0.217	0.222	0.226	0.231	0.235	0.24	0.245	0.25	0.254	0.259	0.264	0.269	0.275	0.28	0.287
0.2	0.205	0.208	0.213	0.217	0.221	0.226	0.231	0.235	0.24	0.243	0.248	0.253	0.259	0.263	0.267	0.272	0.277	0.282	0.287	0.294

Table E.74 Power Study: Sequential Test, n = 15 - H_0 : Gamma(1.5,1); H_a : $\chi^2(4)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.018	0.026	0.034	0.043	0.052	0.061	0.07	0.078	0.087	0.096	0.106	0.116	0.125	0.135	0.144	0.155	0.164	0.175	0.185	0.194
0.02	0.029	0.035	0.042	0.051	0.06	0.069	0.077	0.086	0.094	0.104	0.113	0.122	0.131	0.141	0.151	0.161	0.17	0.181	0.191	0.199
0.03	0.04	0.045	0.05	0.058	0.067	0.075	0.084	0.092	0.1	0.109	0.119	0.128	0.136	0.146	0.155	0.166	0.175	0.185	0.194	0.203
0.04	0.05	0.054	0.058	0.064	0.072	0.081	0.089	0.097	0.105	0.114	0.123	0.132	0.14	0.15	0.159	0.169	0.178	0.188	0.197	0.206
0.05	0.061	0.066	0.069	0.074	0.08	0.087	0.095	0.103	0.111	0.12	0.129	0.137	0.146	0.155	0.164	0.174	0.183	0.192	0.202	0.210
0.06	0.072	0.076	0.079	0.083	0.088	0.094	0.101	0.109	0.116	0.125	0.134	0.142	0.15	0.16	0.168	0.178	0.187	0.196	0.205	0.213
0.07	0.082	0.086	0.089	0.093	0.097	0.102	0.108	0.114	0.121	0.13	0.139	0.147	0.155	0.164	0.172	0.182	0.19	0.2	0.209	0.217
0.08	0.092	0.095	0.098	0.102	0.106	0.11	0.114	0.12	0.127	0.134	0.143	0.151	0.159	0.167	0.176	0.186	0.194	0.203	0.212	0.220
0.09	0.103	0.106	0.108	0.111	0.115	0.119	0.123	0.128	0.133	0.141	0.148	0.156	0.163	0.172	0.18	0.19	0.198	0.207	0.216	0.224
0.1	0.114	0.116	0.119	0.122	0.125	0.129	0.132	0.136	0.141	0.147	0.154	0.161	0.168	0.177	0.185	0.194	0.202	0.211	0.219	0.227
0.11	0.123	0.126	0.128	0.131	0.134	0.138	0.141	0.144	0.148	0.153	0.159	0.166	0.173	0.181	0.188	0.197	0.205	0.214	0.223	0.230
0.12	0.134	0.137	0.139	0.141	0.144	0.148	0.151	0.154	0.157	0.162	0.167	0.172	0.179	0.186	0.193	0.202	0.21	0.218	0.227	0.234
0.13	0.145	0.147	0.149	0.151	0.154	0.157	0.16	0.163	0.166	0.17	0.174	0.179	0.185	0.192	0.199	0.207	0.214	0.222	0.23	0.238
0.14	0.155	0.157	0.159	0.161	0.163	0.166	0.169	0.172	0.175	0.178	0.182	0.186	0.191	0.197	0.203	0.211	0.218	0.226	0.234	0.241
0.15	0.165	0.166	0.168	0.17	0.172	0.175	0.178	0.18	0.183	0.187	0.19	0.194	0.198	0.203	0.209	0.216	0.223	0.23	0.238	0.245
0.16	0.175	0.176	0.178	0.18	0.182	0.184	0.187	0.189	0.192	0.195	0.198	0.201	0.205	0.21	0.215	0.222	0.228	0.235	0.242	0.249
0.17	0.185	0.186	0.187	0.189	0.191	0.193	0.196	0.198	0.2	0.204	0.206	0.209	0.213	0.217	0.222	0.228	0.233	0.24	0.247	0.254
0.18	0.196	0.197	0.199	0.2	0.202	0.204	0.206	0.209	0.211	0.214	0.216	0.219	0.222	0.226	0.229	0.235	0.24	0.245	0.252	0.258
0.19	0.207	0.208	0.209	0.211	0.213	0.214	0.216	0.219	0.221	0.223	0.226	0.228	0.231	0.234	0.238	0.242	0.247	0.252	0.258	0.264
0.2	0.217	0.218	0.219	0.22	0.222	0.224	0.225	0.227	0.229	0.232	0.234	0.237	0.239	0.242	0.245	0.25	0.254	0.259	0.264	0.269

Table E.75 Power Study: Sequential Test, n = 25 - H_0 : Gamma(1.5,1); H_a : $\chi^2(4)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.019	0.026	0.035	0.044	0.054	0.063	0.072	0.081	0.091	0.1	0.109	0.12	0.131	0.14	0.151	0.16	0.171	0.182	0.192	0.201
0.02	0.03	0.035	0.042	0.051	0.06	0.069	0.077	0.086	0.096	0.104	0.113	0.124	0.134	0.143	0.153	0.163	0.173	0.184	0.194	0.203
0.03	0.042	0.046	0.051	0.058	0.066	0.074	0.083	0.091	0.1	0.109	0.117	0.128	0.138	0.146	0.156	0.166	0.176	0.186	0.196	0.205
0.04	0.053	0.056	0.06	0.065	0.073	0.08	0.088	0.096	0.105	0.113	0.121	0.132	0.142	0.149	0.159	0.169	0.179	0.189	0.198	0.206
0.05	0.066	0.069	0.072	0.075	0.081	0.087	0.094	0.102	0.111	0.118	0.126	0.136	0.146	0.153	0.163	0.172	0.182	0.192	0.201	0.209
0.06	0.077	0.079	0.082	0.085	0.089	0.094	0.1	0.108	0.116	0.122	0.13	0.14	0.149	0.156	0.166	0.175	0.185	0.194	0.203	0.211
0.07	0.087	0.089	0.091	0.093	0.097	0.1	0.106	0.113	0.12	0.127	0.134	0.143	0.153	0.16	0.169	0.178	0.187	0.196	0.205	0.213
0.08	0.099	0.1	0.102	0.104	0.107	0.11	0.114	0.12	0.126	0.132	0.139	0.148	0.157	0.164	0.173	0.181	0.191	0.2	0.208	0.216
0.09	0.109	0.11	0.112	0.114	0.116	0.119	0.122	0.127	0.133	0.138	0.145	0.153	0.162	0.168	0.177	0.185	0.194	0.203	0.212	0.219
0.1	0.121	0.122	0.123	0.125	0.127	0.129	0.132	0.136	0.141	0.145	0.151	0.159	0.167	0.173	0.181	0.19	0.198	0.207	0.215	0.222
0.11	0.132	0.133	0.134	0.135	0.137	0.139	0.141	0.144	0.148	0.152	0.158	0.165	0.172	0.178	0.186	0.194	0.202	0.211	0.219	0.226
0.12	0.142	0.143	0.144	0.145	0.147	0.149	0.15	0.153	0.156	0.16	0.164	0.171	0.178	0.184	0.191	0.198	0.207	0.214	0.222	0.229
0.13	0.153	0.153	0.154	0.155	0.157	0.158	0.16	0.162	0.165	0.168	0.172	0.178	0.184	0.189	0.196	0.203	0.211	0.218	0.226	0.233
0.14	0.164	0.164	0.165	0.166	0.167	0.168	0.17	0.172	0.174	0.176	0.18	0.185	0.19	0.195	0.202	0.208	0.216	0.223	0.23	0.236
0.15	0.174	0.174	0.175	0.176	0.177	0.178	0.179	0.181	0.183	0.185	0.188	0.192	0.197	0.201	0.207	0.214	0.221	0.227	0.234	0.240
0.16	0.185	0.185	0.186	0.186	0.187	0.188	0.189	0.191	0.193	0.195	0.197	0.201	0.205	0.209	0.214	0.22	0.226	0.233	0.239	0.245
0.17	0.196	0.196	0.196	0.197	0.198	0.198	0.199	0.201	0.203	0.204	0.206	0.21	0.213	0.216	0.221	0.226	0.232	0.238	0.245	0.250
0.18	0.207	0.207	0.207	0.207	0.208	0.209	0.21	0.211	0.213	0.214	0.216	0.219	0.222	0.225	0.229	0.233	0.239	0.245	0.251	0.256
0.19	0.218	0.218	0.218	0.219	0.219	0.22	0.22	0.222	0.223	0.224	0.226	0.229	0.231	0.234	0.237	0.241	0.246	0.252	0.257	0.261
0.2	0.228	0.228	0.229	0.229	0.229	0.23	0.23	0.232	0.233	0.234	0.235	0.237	0.24	0.242	0.245	0.248	0.253	0.258	0.263	0.267

Table E.76 Power Study: Sequential Test, n = 50 - H_0 : Gamma(1.5,1); H_a : $\chi^2(4)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.022	0.03	0.038	0.048	0.058	0.068	0.078	0.088	0.098	0.108	0.119	0.129	0.14	0.149	0.158	0.169	0.179	0.188	0.199	0.211
0.02	0.035	0.039	0.046	0.055	0.064	0.073	0.082	0.091	0.101	0.111	0.121	0.131	0.141	0.151	0.16	0.17	0.18	0.189	0.2	0.212
0.03	0.048	0.051	0.056	0.063	0.071	0.079	0.087	0.095	0.105	0.114	0.124	0.133	0.144	0.153	0.162	0.172	0.181	0.191	0.202	0.213
0.04	0.061	0.063	0.066	0.071	0.078	0.085	0.092	0.1	0.109	0.118	0.127	0.136	0.146	0.155	0.164	0.174	0.183	0.192	0.203	0.214
0.05	0.074	0.075	0.077	0.08	0.086	0.092	0.098	0.106	0.114	0.123	0.132	0.14	0.15	0.158	0.167	0.176	0.185	0.194	0.205	0.215
0.06	0.086	0.087	0.088	0.091	0.095	0.1	0.105	0.111	0.119	0.127	0.136	0.143	0.153	0.161	0.169	0.178	0.187	0.196	0.206	0.217
0.07	0.098	0.099	0.1	0.102	0.105	0.108	0.113	0.118	0.125	0.132	0.14	0.148	0.157	0.165	0.173	0.182	0.19	0.199	0.209	0.219
0.08	0.109	0.11	0.11	0.112	0.114	0.117	0.12	0.125	0.131	0.138	0.145	0.152	0.161	0.169	0.176	0.185	0.193	0.201	0.211	0.221
0.09	0.121	0.121	0.122	0.123	0.125	0.127	0.13	0.133	0.139	0.145	0.151	0.158	0.166	0.173	0.18	0.189	0.197	0.205	0.214	0.224
0.1	0.131	0.132	0.132	0.133	0.134	0.135	0.138	0.141	0.145	0.151	0.157	0.163	0.17	0.177	0.184	0.192	0.2	0.208	0.217	0.226
0.11	0.142	0.143	0.143	0.143	0.144	0.146	0.147	0.15	0.154	0.158	0.163	0.168	0.176	0.182	0.189	0.196	0.203	0.211	0.22	0.229
0.12	0.154	0.154	0.154	0.155	0.155	0.157	0.158	0.16	0.163	0.166	0.171	0.175	0.182	0.188	0.194	0.201	0.208	0.215	0.223	0.233
0.13	0.165	0.165	0.165	0.165	0.166	0.167	0.168	0.169	0.171	0.174	0.178	0.182	0.188	0.193	0.199	0.205	0.212	0.219	0.227	0.236
0.14	0.175	0.175	0.175	0.176	0.176	0.177	0.178	0.178	0.18	0.183	0.186	0.189	0.195	0.199	0.205	0.211	0.217	0.224	0.231	0.240
0.15	0.186	0.186	0.186	0.186	0.187	0.187	0.188	0.189	0.19	0.192	0.195	0.198	0.202	0.206	0.211	0.217	0.222	0.228	0.236	0.244
0.16	0.196	0.196	0.196	0.196	0.197	0.197	0.198	0.198	0.199	0.201	0.203	0.206	0.21	0.214	0.218	0.223	0.228	0.234	0.241	0.248
0.17	0.208	0.208	0.208	0.208	0.208	0.209	0.209	0.21	0.21	0.212	0.214	0.215	0.219	0.222	0.226	0.23	0.235	0.241	0.247	0.254
0.18	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.221	0.221	0.222	0.224	0.225	0.228	0.231	0.234	0.238	0.243	0.248	0.253	0.260
0.19	0.229	0.229	0.229	0.229	0.229	0.229	0.23	0.23	0.231	0.231	0.233	0.234	0.236	0.239	0.242	0.245	0.249	0.254	0.259	0.265
0.2	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.241	0.242	0.243	0.244	0.245	0.248	0.25	0.253	0.257	0.261	0.266	0.271

E.4 H_0: *Gamma* ($\beta = 3.5$)

Table E.77 Power Study: Sequential Test, n = 5 - H_0 : Gamma(3.5,1); H_a: Beta(2,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.019	0.026	0.033	0.041	0.048	0.056	0.063	0.071	0.078	0.087	0.096	0.106	0.115	0.124	0.132	0.141	0.151	0.16	0.17	0.179
0.02	0.031	0.037	0.045	0.052	0.059	0.067	0.074	0.082	0.089	0.097	0.105	0.113	0.121	0.129	0.136	0.144	0.153	0.162	0.171	0.180
0.03	0.044	0.05	0.056	0.063	0.071	0.079	0.086	0.094	0.1	0.108	0.117	0.125	0.132	0.14	0.147	0.154	0.163	0.171	0.179	0.187
0.04	0.056	0.062	0.068	0.074	0.081	0.089	0.096	0.104	0.111	0.119	0.127	0.135	0.142	0.15	0.157	0.165	0.173	0.181	0.189	0.197
0.05	0.07	0.076	0.082	0.088	0.094	0.101	0.108	0.116	0.123	0.131	0.139	0.147	0.155	0.162	0.169	0.177	0.185	0.193	0.201	0.209
0.06	0.082	0.088	0.094	0.1	0.106	0.112	0.119	0.126	0.133	0.141	0.149	0.157	0.165	0.172	0.179	0.187	0.195	0.203	0.211	0.219
0.07	0.093	0.099	0.105	0.111	0.117	0.123	0.129	0.136	0.143	0.151	0.159	0.167	0.174	0.182	0.189	0.197	0.205	0.213	0.221	0.229
0.08	0.104	0.11	0.116	0.122	0.129	0.135	0.141	0.147	0.153	0.161	0.169	0.177	0.184	0.192	0.199	0.207	0.215	0.223	0.231	0.239
0.09	0.114	0.12	0.126	0.132	0.139	0.145	0.151	0.157	0.163	0.17	0.178	0.186	0.193	0.2	0.207	0.215	0.224	0.231	0.239	0.247
0.1	0.125	0.131	0.137	0.143	0.149	0.155	0.161	0.168	0.173	0.18	0.188	0.195	0.202	0.21	0.216	0.224	0.233	0.24	0.248	0.256
0.11	0.136	0.142	0.148	0.154	0.16	0.166	0.172	0.178	0.184	0.191	0.198	0.205	0.212	0.219	0.226	0.233	0.242	0.249	0.257	0.265
0.12	0.146	0.152	0.158	0.164	0.171	0.177	0.183	0.189	0.195	0.201	0.208	0.215	0.222	0.229	0.235	0.243	0.251	0.258	0.266	0.274
0.13	0.157	0.163	0.169	0.175	0.181	0.188	0.194	0.2	0.206	0.212	0.219	0.226	0.232	0.239	0.245	0.252	0.26	0.268	0.276	0.284
0.14	0.168	0.174	0.18	0.186	0.193	0.199	0.205	0.211	0.217	0.223	0.23	0.236	0.243	0.249	0.255	0.262	0.27	0.277	0.285	0.293
0.15	0.178	0.184	0.19	0.196	0.203	0.209	0.215	0.221	0.227	0.233	0.24	0.246	0.253	0.259	0.265	0.272	0.279	0.286	0.294	0.301
0.16	0.189	0.195	0.201	0.207	0.213	0.22	0.226	0.232	0.237	0.244	0.251	0.257	0.263	0.269	0.275	0.282	0.289	0.296	0.304	0.311
0.17	0.2	0.206	0.212	0.218	0.224	0.23	0.236	0.242	0.248	0.255	0.261	0.268	0.274	0.28	0.286	0.292	0.299	0.306	0.313	0.320
0.18	0.21	0.216	0.222	0.228	0.234	0.241	0.247	0.253	0.259	0.265	0.272	0.278	0.284	0.29	0.296	0.303	0.31	0.316	0.323	0.330
0.19	0.222	0.228	0.234	0.24	0.246	0.252	0.258	0.264	0.27	0.277	0.283	0.29	0.296	0.302	0.307	0.314	0.321	0.327	0.334	0.341
0.2	0.232	0.238	0.244	0.25	0.256	0.262	0.268	0.274	0.28	0.287	0.293	0.3	0.306	0.312	0.317	0.324	0.331	0.337	0.344	0.351

Table E.78 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a: Beta(2,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.078	0.093	0.108	0.121	0.136	0.151	0.164	0.177	0.19	0.203	0.215	0.227	0.24	0.252	0.263	0.276	0.286	0.299	0.309	0.320
0.02	0.12	0.135	0.149	0.162	0.177	0.192	0.205	0.218	0.231	0.244	0.255	0.268	0.28	0.292	0.303	0.315	0.326	0.338	0.348	0.359
0.03	0.16	0.174	0.189	0.202	0.217	0.231	0.244	0.256	0.27	0.282	0.293	0.306	0.317	0.329	0.34	0.352	0.362	0.373	0.384	0.394
0.04	0.192	0.206	0.22	0.234	0.248	0.262	0.274	0.287	0.3	0.312	0.323	0.335	0.346	0.358	0.368	0.38	0.39	0.4	0.41	0.421
0.05	0.221	0.235	0.249	0.262	0.276	0.29	0.301	0.314	0.327	0.338	0.349	0.361	0.371	0.382	0.392	0.404	0.413	0.424	0.433	0.443
0.06	0.249	0.263	0.276	0.289	0.302	0.316	0.327	0.339	0.351	0.362	0.373	0.384	0.394	0.405	0.414	0.425	0.434	0.444	0.453	0.463
0.07	0.278	0.292	0.304	0.316	0.33	0.342	0.353	0.364	0.376	0.387	0.397	0.407	0.417	0.427	0.436	0.447	0.456	0.465	0.474	0.483
0.08	0.301	0.315	0.327	0.338	0.351	0.364	0.374	0.385	0.396	0.406	0.416	0.426	0.436	0.445	0.454	0.464	0.473	0.482	0.49	0.499
0.09	0.323	0.336	0.348	0.359	0.371	0.383	0.393	0.403	0.414	0.424	0.434	0.444	0.453	0.462	0.47	0.48	0.488	0.497	0.505	0.514
0.1	0.344	0.356	0.367	0.378	0.39	0.402	0.411	0.421	0.432	0.442	0.45	0.46	0.469	0.477	0.486	0.495	0.503	0.512	0.52	0.528
0.11	0.364	0.375	0.386	0.396	0.408	0.419	0.428	0.438	0.448	0.458	0.466	0.475	0.484	0.492	0.5	0.509	0.517	0.525	0.533	0.541
0.12	0.384	0.395	0.405	0.415	0.426	0.436	0.445	0.454	0.464	0.473	0.482	0.49	0.498	0.506	0.514	0.523	0.53	0.538	0.546	0.553
0.13	0.4	0.411	0.421	0.43	0.441	0.451	0.459	0.468	0.477	0.486	0.494	0.503	0.511	0.519	0.526	0.535	0.542	0.55	0.557	0.564
0.14	0.419	0.429	0.438	0.447	0.457	0.467	0.475	0.484	0.492	0.501	0.509	0.517	0.525	0.532	0.539	0.547	0.554	0.562	0.568	0.576
0.15	0.437	0.446	0.455	0.464	0.473	0.483	0.49	0.498	0.507	0.515	0.523	0.53	0.538	0.545	0.551	0.559	0.566	0.573	0.58	0.587
0.16	0.453	0.462	0.47	0.478	0.487	0.496	0.504	0.512	0.52	0.528	0.535	0.543	0.55	0.557	0.563	0.571	0.577	0.584	0.59	0.597
0.17	0.467	0.476	0.484	0.492	0.501	0.509	0.516	0.524	0.532	0.54	0.546	0.554	0.56	0.567	0.573	0.58	0.587	0.594	0.6	0.606
0.18	0.481	0.49	0.497	0.505	0.513	0.522	0.528	0.536	0.543	0.551	0.557	0.564	0.57	0.577	0.583	0.59	0.596	0.602	0.608	0.614
0.19	0.495	0.503	0.51	0.517	0.525	0.533	0.54	0.547	0.554	0.561	0.567	0.574	0.58	0.586	0.592	0.599	0.604	0.611	0.617	0.623
0.2	0.51	0.517	0.524	0.531	0.538	0.546	0.552	0.559	0.565	0.572	0.578	0.585	0.59	0.596	0.602	0.608	0.614	0.62	0.625	0.631

Table E.79 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a: Beta(2,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.197	0.225	0.252	0.277	0.299	0.324	0.345	0.365	0.386	0.404	0.421	0.438	0.452	0.469	0.486	0.501	0.516	0.53	0.544	0.557
0.02	0.288	0.313	0.338	0.361	0.38	0.402	0.421	0.438	0.456	0.473	0.488	0.502	0.515	0.529	0.544	0.558	0.571	0.583	0.595	0.607
0.03	0.357	0.379	0.401	0.421	0.439	0.458	0.475	0.49	0.506	0.521	0.535	0.548	0.559	0.572	0.585	0.597	0.608	0.619	0.63	0.641
0.04	0.408	0.428	0.448	0.466	0.481	0.498	0.514	0.528	0.542	0.555	0.568	0.579	0.59	0.601	0.613	0.624	0.634	0.644	0.654	0.664
0.05	0.452	0.469	0.487	0.504	0.517	0.533	0.547	0.56	0.573	0.585	0.596	0.607	0.616	0.626	0.637	0.647	0.657	0.666	0.675	0.684
0.06	0.489	0.504	0.521	0.536	0.548	0.562	0.575	0.587	0.599	0.61	0.621	0.63	0.639	0.648	0.659	0.668	0.677	0.685	0.694	0.702
0.07	0.522	0.536	0.551	0.565	0.576	0.589	0.601	0.611	0.622	0.632	0.642	0.651	0.659	0.668	0.677	0.686	0.694	0.702	0.71	0.718
0.08	0.549	0.562	0.575	0.588	0.598	0.61	0.621	0.63	0.64	0.65	0.659	0.667	0.674	0.683	0.692	0.7	0.708	0.715	0.723	0.730
0.09	0.576	0.588	0.6	0.612	0.621	0.631	0.641	0.65	0.659	0.668	0.676	0.683	0.69	0.698	0.706	0.714	0.721	0.728	0.735	0.742
0.1	0.6	0.611	0.622	0.632	0.64	0.65	0.659	0.667	0.676	0.684	0.692	0.698	0.705	0.712	0.72	0.727	0.734	0.74	0.747	0.753
0.11	0.621	0.631	0.641	0.651	0.658	0.667	0.676	0.683	0.691	0.698	0.705	0.712	0.718	0.725	0.732	0.738	0.745	0.751	0.757	0.763
0.12	0.641	0.65	0.659	0.668	0.675	0.683	0.691	0.698	0.706	0.712	0.719	0.725	0.73	0.737	0.743	0.75	0.756	0.762	0.767	0.773
0.13	0.658	0.666	0.675	0.683	0.689	0.697	0.705	0.711	0.718	0.724	0.731	0.736	0.741	0.747	0.753	0.759	0.765	0.771	0.776	0.782
0.14	0.674	0.681	0.689	0.697	0.703	0.71	0.717	0.723	0.73	0.736	0.742	0.747	0.751	0.757	0.763	0.769	0.774	0.779	0.784	0.790
0.15	0.691	0.697	0.704	0.711	0.716	0.723	0.73	0.735	0.741	0.747	0.753	0.757	0.762	0.767	0.773	0.778	0.783	0.788	0.793	0.797
0.16	0.706	0.712	0.718	0.724	0.729	0.735	0.741	0.747	0.752	0.758	0.763	0.767	0.771	0.776	0.781	0.786	0.791	0.795	0.8	0.805
0.17	0.719	0.723	0.73	0.735	0.74	0.746	0.751	0.756	0.762	0.767	0.772	0.776	0.78	0.784	0.789	0.794	0.798	0.803	0.807	0.811
0.18	0.732	0.736	0.742	0.747	0.751	0.756	0.762	0.767	0.772	0.776	0.781	0.785	0.788	0.793	0.797	0.801	0.805	0.81	0.814	0.818
0.19	0.744	0.748	0.754	0.758	0.763	0.767	0.772	0.776	0.781	0.785	0.789	0.793	0.796	0.8	0.804	0.808	0.812	0.816	0.82	0.824
0.2	0.757	0.76	0.765	0.77	0.773	0.778	0.782	0.786	0.79	0.794	0.798	0.802	0.805	0.808	0.812	0.816	0.82	0.823	0.827	0.831

Table E.80 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a: Beta(2,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.646	0.686	0.717	0.743	0.766	0.787	0.805	0.823	0.836	0.849	0.861	0.871	0.881	0.89	0.898	0.906	0.912	0.918	0.924	0.929
0.02	0.745	0.771	0.792	0.81	0.825	0.839	0.852	0.864	0.874	0.883	0.892	0.899	0.907	0.913	0.92	0.926	0.93	0.935	0.939	0.943
0.03	0.798	0.816	0.832	0.845	0.857	0.868	0.877	0.887	0.895	0.902	0.909	0.915	0.921	0.926	0.931	0.936	0.94	0.944	0.947	0.951
0.04	0.835	0.848	0.86	0.87	0.879	0.888	0.896	0.904	0.91	0.916	0.922	0.926	0.931	0.936	0.94	0.944	0.947	0.951	0.954	0.957
0.05	0.862	0.872	0.881	0.889	0.897	0.904	0.91	0.917	0.922	0.927	0.931	0.935	0.939	0.943	0.947	0.951	0.953	0.956	0.959	0.962
0.06	0.885	0.892	0.899	0.906	0.911	0.917	0.922	0.928	0.932	0.936	0.94	0.943	0.947	0.95	0.953	0.956	0.958	0.961	0.963	0.966
0.07	0.901	0.907	0.912	0.918	0.923	0.927	0.932	0.936	0.94	0.943	0.947	0.95	0.952	0.955	0.958	0.961	0.962	0.965	0.967	0.969
0.08	0.914	0.919	0.923	0.928	0.932	0.936	0.94	0.944	0.946	0.949	0.952	0.955	0.957	0.96	0.962	0.964	0.966	0.968	0.969	0.971
0.09	0.925	0.929	0.932	0.936	0.94	0.943	0.946	0.949	0.952	0.954	0.957	0.959	0.961	0.963	0.965	0.967	0.969	0.97	0.972	0.974
0.1	0.934	0.937	0.94	0.943	0.946	0.948	0.952	0.954	0.956	0.958	0.96	0.963	0.964	0.966	0.968	0.97	0.971	0.973	0.974	0.975
0.11	0.941	0.944	0.946	0.949	0.951	0.954	0.956	0.959	0.96	0.962	0.964	0.966	0.967	0.969	0.971	0.972	0.974	0.975	0.976	0.977
0.12	0.948	0.95	0.952	0.954	0.956	0.958	0.96	0.963	0.964	0.966	0.967	0.969	0.97	0.972	0.973	0.975	0.976	0.977	0.978	0.979
0.13	0.954	0.955	0.957	0.958	0.96	0.962	0.964	0.966	0.967	0.969	0.97	0.971	0.973	0.974	0.975	0.976	0.978	0.979	0.98	0.981
0.14	0.959	0.96	0.962	0.963	0.965	0.966	0.968	0.969	0.97	0.972	0.973	0.974	0.975	0.976	0.978	0.978	0.979	0.98	0.981	0.982
0.15	0.963	0.964	0.965	0.966	0.968	0.969	0.971	0.972	0.973	0.974	0.975	0.976	0.977	0.978	0.979	0.98	0.981	0.982	0.983	0.983
0.16	0.967	0.968	0.969	0.969	0.97	0.972	0.973	0.974	0.975	0.976	0.977	0.978	0.979	0.98	0.981	0.981	0.982	0.983	0.984	0.985
0.17	0.97	0.971	0.972	0.972	0.973	0.974	0.975	0.976	0.977	0.978	0.979	0.979	0.98	0.981	0.982	0.983	0.984	0.984	0.985	0.986
0.18	0.974	0.974	0.974	0.975	0.976	0.977	0.977	0.978	0.979	0.979	0.98	0.981	0.982	0.983	0.983	0.984	0.985	0.986	0.986	0.987
0.19	0.976	0.976	0.976	0.977	0.978	0.978	0.979	0.98	0.98	0.981	0.982	0.982	0.983	0.984	0.985	0.985	0.986	0.987	0.987	0.988
0.2	0.978	0.978	0.978	0.979	0.979	0.98	0.981	0.981	0.982	0.982	0.983	0.984	0.984	0.985	0.986	0.986	0.987	0.988	0.988	0.989

Table E.81 Power Study: Sequential Test, n = 5 - H_0 : Gamma(3.5,1); H_a: Beta(2,3)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.016	0.024	0.031	0.039	0.048	0.056	0.063	0.072	0.08	0.089	0.098	0.108	0.117	0.127	0.136	0.145	0.154	0.164	0.172	0.182
0.02	0.027	0.032	0.039	0.048	0.056	0.064	0.071	0.081	0.088	0.096	0.104	0.113	0.122	0.13	0.138	0.147	0.155	0.165	0.173	0.182
0.03	0.036	0.042	0.048	0.055	0.063	0.071	0.079	0.088	0.096	0.104	0.112	0.121	0.129	0.138	0.145	0.153	0.161	0.17	0.178	0.187
0.04	0.047	0.053	0.058	0.065	0.072	0.08	0.087	0.097	0.104	0.112	0.12	0.129	0.138	0.146	0.154	0.162	0.17	0.178	0.186	0.194
0.05	0.057	0.062	0.068	0.074	0.081	0.088	0.095	0.104	0.112	0.12	0.128	0.137	0.145	0.154	0.161	0.17	0.177	0.186	0.193	0.202
0.06	0.066	0.071	0.077	0.083	0.09	0.096	0.102	0.111	0.119	0.127	0.135	0.144	0.152	0.161	0.168	0.176	0.184	0.193	0.2	0.208
0.07	0.075	0.08	0.086	0.092	0.099	0.105	0.111	0.119	0.126	0.134	0.142	0.151	0.159	0.167	0.175	0.183	0.191	0.199	0.207	0.215
0.08	0.086	0.091	0.097	0.103	0.11	0.116	0.121	0.129	0.135	0.142	0.15	0.159	0.167	0.175	0.183	0.191	0.199	0.207	0.215	0.223
0.09	0.095	0.101	0.106	0.113	0.119	0.125	0.131	0.138	0.143	0.15	0.157	0.166	0.174	0.182	0.19	0.198	0.206	0.214	0.222	0.230
0.1	0.104	0.109	0.115	0.121	0.128	0.134	0.139	0.146	0.152	0.158	0.165	0.173	0.18	0.189	0.196	0.205	0.212	0.221	0.228	0.237
0.11	0.113	0.119	0.124	0.131	0.137	0.143	0.149	0.156	0.161	0.167	0.174	0.181	0.189	0.197	0.204	0.212	0.219	0.228	0.235	0.244
0.12	0.123	0.129	0.134	0.141	0.147	0.153	0.159	0.166	0.171	0.177	0.183	0.19	0.197	0.205	0.212	0.219	0.227	0.235	0.243	0.251
0.13	0.132	0.138	0.144	0.15	0.156	0.163	0.168	0.175	0.18	0.186	0.192	0.199	0.206	0.213	0.219	0.227	0.234	0.242	0.249	0.258
0.14	0.141	0.147	0.153	0.159	0.166	0.172	0.177	0.184	0.189	0.195	0.201	0.208	0.214	0.221	0.228	0.234	0.241	0.249	0.256	0.265
0.15	0.15	0.156	0.162	0.168	0.174	0.181	0.186	0.193	0.198	0.204	0.21	0.217	0.223	0.23	0.236	0.243	0.249	0.257	0.263	0.271
0.16	0.16	0.165	0.171	0.177	0.184	0.19	0.195	0.202	0.207	0.213	0.219	0.226	0.232	0.239	0.245	0.251	0.257	0.265	0.271	0.279
0.17	0.169	0.175	0.18	0.187	0.193	0.199	0.205	0.211	0.217	0.223	0.229	0.236	0.242	0.248	0.254	0.26	0.266	0.273	0.28	0.287
0.18	0.178	0.184	0.19	0.196	0.202	0.209	0.214	0.221	0.226	0.232	0.238	0.245	0.251	0.257	0.263	0.269	0.275	0.282	0.288	0.295
0.19	0.189	0.195	0.201	0.207	0.213	0.22	0.225	0.232	0.237	0.243	0.249	0.256	0.262	0.268	0.274	0.28	0.285	0.292	0.298	0.305
0.2	0.2	0.205	0.211	0.217	0.224	0.23	0.235	0.242	0.247	0.253	0.259	0.266	0.272	0.278	0.284	0.29	0.296	0.302	0.308	0.315

Table E.82 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a: Beta(2,3)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.031	0.043	0.055	0.067	0.079	0.09	0.101	0.113	0.123	0.132	0.142	0.153	0.164	0.174	0.183	0.194	0.204	0.214	0.224	0.233
0.02	0.049	0.061	0.072	0.084	0.097	0.107	0.119	0.13	0.14	0.149	0.16	0.17	0.181	0.191	0.2	0.211	0.22	0.231	0.24	0.250
0.03	0.068	0.08	0.091	0.103	0.115	0.126	0.137	0.149	0.158	0.168	0.177	0.188	0.199	0.209	0.217	0.228	0.237	0.247	0.257	0.266
0.04	0.085	0.096	0.108	0.119	0.131	0.142	0.153	0.164	0.174	0.183	0.193	0.203	0.214	0.224	0.232	0.242	0.252	0.262	0.271	0.280
0.05	0.101	0.112	0.124	0.135	0.147	0.157	0.168	0.179	0.189	0.197	0.207	0.217	0.228	0.237	0.246	0.256	0.265	0.275	0.284	0.292
0.06	0.117	0.128	0.139	0.15	0.162	0.172	0.182	0.193	0.203	0.211	0.221	0.23	0.241	0.25	0.259	0.268	0.277	0.287	0.296	0.304
0.07	0.132	0.143	0.154	0.165	0.176	0.186	0.196	0.207	0.216	0.224	0.233	0.243	0.253	0.262	0.271	0.28	0.289	0.298	0.307	0.315
0.08	0.147	0.157	0.168	0.178	0.189	0.199	0.209	0.219	0.228	0.236	0.245	0.254	0.265	0.273	0.281	0.291	0.3	0.309	0.317	0.325
0.09	0.162	0.172	0.182	0.193	0.203	0.212	0.222	0.232	0.241	0.249	0.257	0.266	0.276	0.285	0.293	0.302	0.311	0.32	0.327	0.336
0.1	0.177	0.187	0.197	0.207	0.217	0.226	0.235	0.245	0.253	0.261	0.269	0.278	0.287	0.296	0.304	0.313	0.321	0.329	0.337	0.345
0.11	0.191	0.2	0.21	0.22	0.23	0.238	0.247	0.256	0.265	0.272	0.28	0.288	0.298	0.306	0.314	0.322	0.33	0.339	0.346	0.354
0.12	0.204	0.213	0.222	0.232	0.241	0.25	0.258	0.267	0.275	0.282	0.29	0.298	0.308	0.316	0.323	0.331	0.339	0.347	0.355	0.362
0.13	0.216	0.225	0.234	0.243	0.252	0.26	0.268	0.277	0.285	0.292	0.3	0.307	0.317	0.325	0.331	0.34	0.347	0.355	0.363	0.370
0.14	0.229	0.238	0.246	0.255	0.264	0.271	0.279	0.288	0.296	0.302	0.31	0.317	0.326	0.334	0.341	0.349	0.356	0.364	0.371	0.378
0.15	0.242	0.251	0.258	0.267	0.276	0.283	0.29	0.299	0.307	0.313	0.32	0.328	0.336	0.344	0.35	0.358	0.365	0.373	0.38	0.387
0.16	0.255	0.263	0.27	0.278	0.287	0.294	0.301	0.309	0.317	0.323	0.33	0.337	0.346	0.353	0.359	0.367	0.374	0.382	0.388	0.395
0.17	0.267	0.275	0.282	0.29	0.298	0.305	0.312	0.32	0.327	0.333	0.34	0.347	0.355	0.362	0.368	0.376	0.383	0.39	0.397	0.404
0.18	0.278	0.286	0.293	0.3	0.308	0.315	0.322	0.329	0.336	0.342	0.349	0.356	0.363	0.37	0.376	0.384	0.39	0.397	0.404	0.410
0.19	0.29	0.297	0.303	0.311	0.318	0.324	0.331	0.339	0.345	0.351	0.358	0.365	0.372	0.379	0.384	0.392	0.398	0.405	0.411	0.417
0.2	0.302	0.309	0.315	0.322	0.329	0.335	0.342	0.349	0.355	0.361	0.367	0.374	0.381	0.387	0.393	0.4	0.406	0.413	0.419	0.425

Table E.83 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a: Beta(2,3)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.064	0.083	0.102	0.117	0.133	0.15	0.166	0.182	0.198	0.214	0.229	0.242	0.256	0.269	0.285	0.298	0.312	0.325	0.338	0.351
0.02	0.1	0.118	0.136	0.15	0.165	0.18	0.196	0.211	0.227	0.241	0.255	0.268	0.281	0.294	0.308	0.321	0.334	0.346	0.36	0.372
0.03	0.13	0.147	0.164	0.178	0.192	0.206	0.221	0.235	0.25	0.264	0.277	0.289	0.301	0.314	0.328	0.34	0.352	0.364	0.377	0.388
0.04	0.159	0.174	0.19	0.203	0.216	0.23	0.243	0.257	0.271	0.284	0.296	0.307	0.319	0.331	0.345	0.356	0.368	0.379	0.391	0.402
0.05	0.184	0.199	0.213	0.226	0.238	0.25	0.263	0.276	0.289	0.302	0.314	0.324	0.336	0.347	0.36	0.371	0.382	0.392	0.404	0.414
0.06	0.207	0.221	0.235	0.246	0.258	0.269	0.281	0.294	0.306	0.319	0.33	0.34	0.351	0.361	0.374	0.385	0.395	0.405	0.416	0.426
0.07	0.227	0.24	0.253	0.264	0.275	0.286	0.297	0.309	0.321	0.333	0.344	0.353	0.363	0.373	0.385	0.396	0.406	0.416	0.426	0.436
0.08	0.246	0.258	0.27	0.281	0.291	0.301	0.312	0.323	0.335	0.346	0.356	0.365	0.375	0.385	0.397	0.407	0.416	0.426	0.436	0.445
0.09	0.266	0.277	0.288	0.298	0.308	0.318	0.328	0.338	0.349	0.36	0.37	0.378	0.388	0.398	0.408	0.418	0.427	0.436	0.446	0.455
0.1	0.285	0.296	0.307	0.316	0.325	0.334	0.344	0.354	0.364	0.374	0.383	0.391	0.4	0.41	0.42	0.43	0.438	0.447	0.456	0.465
0.11	0.304	0.314	0.324	0.332	0.341	0.349	0.359	0.368	0.378	0.388	0.397	0.404	0.413	0.421	0.431	0.441	0.449	0.457	0.466	0.475
0.12	0.321	0.33	0.34	0.348	0.356	0.364	0.373	0.381	0.391	0.4	0.409	0.416	0.424	0.432	0.442	0.451	0.459	0.467	0.476	0.484
0.13	0.338	0.346	0.355	0.362	0.37	0.378	0.386	0.394	0.404	0.412	0.42	0.427	0.435	0.443	0.453	0.461	0.469	0.477	0.485	0.493
0.14	0.353	0.361	0.369	0.376	0.383	0.391	0.399	0.407	0.415	0.424	0.431	0.437	0.445	0.453	0.462	0.47	0.477	0.485	0.493	0.501
0.15	0.369	0.377	0.385	0.391	0.398	0.405	0.412	0.419	0.428	0.436	0.443	0.449	0.456	0.463	0.472	0.48	0.487	0.494	0.502	0.509
0.16	0.386	0.393	0.4	0.406	0.412	0.419	0.426	0.432	0.44	0.448	0.454	0.46	0.467	0.474	0.482	0.49	0.496	0.503	0.511	0.518
0.17	0.4	0.407	0.414	0.419	0.425	0.431	0.438	0.444	0.452	0.458	0.465	0.47	0.477	0.484	0.492	0.499	0.505	0.512	0.519	0.526
0.18	0.415	0.421	0.427	0.432	0.438	0.443	0.449	0.455	0.462	0.469	0.475	0.48	0.487	0.493	0.501	0.508	0.514	0.52	0.527	0.533
0.19	0.431	0.437	0.442	0.447	0.452	0.457	0.463	0.469	0.475	0.482	0.487	0.492	0.498	0.505	0.512	0.518	0.524	0.53	0.536	0.543
0.2	0.444	0.449	0.454	0.459	0.463	0.468	0.474	0.479	0.486	0.492	0.497	0.502	0.507	0.513	0.52	0.527	0.532	0.538	0.544	0.550

Table E.84 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a: Beta(2,3)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.205	0.246	0.281	0.315	0.347	0.379	0.407	0.433	0.457	0.479	0.5	0.517	0.537	0.557	0.573	0.592	0.608	0.624	0.64	0.656
0.02	0.278	0.311	0.34	0.368	0.395	0.422	0.446	0.469	0.489	0.509	0.527	0.543	0.561	0.579	0.593	0.611	0.625	0.64	0.654	0.669
0.03	0.334	0.361	0.385	0.409	0.432	0.456	0.478	0.497	0.516	0.534	0.55	0.564	0.581	0.597	0.61	0.626	0.64	0.653	0.667	0.680
0.04	0.384	0.406	0.426	0.446	0.466	0.487	0.506	0.523	0.54	0.556	0.571	0.584	0.599	0.614	0.626	0.641	0.653	0.666	0.678	0.691
0.05	0.426	0.444	0.461	0.479	0.496	0.515	0.532	0.547	0.562	0.576	0.59	0.602	0.616	0.63	0.641	0.655	0.666	0.678	0.689	0.701
0.06	0.466	0.48	0.495	0.51	0.525	0.541	0.556	0.57	0.584	0.596	0.609	0.62	0.632	0.645	0.655	0.668	0.678	0.689	0.7	0.711
0.07	0.5	0.512	0.524	0.537	0.55	0.565	0.578	0.591	0.603	0.615	0.626	0.636	0.648	0.659	0.669	0.68	0.691	0.701	0.711	0.721
0.08	0.526	0.536	0.547	0.559	0.571	0.584	0.596	0.607	0.619	0.63	0.64	0.649	0.66	0.671	0.68	0.691	0.7	0.71	0.719	0.729
0.09	0.553	0.561	0.57	0.581	0.592	0.603	0.614	0.624	0.635	0.645	0.655	0.663	0.673	0.683	0.691	0.701	0.71	0.719	0.728	0.737
0.1	0.577	0.584	0.592	0.601	0.611	0.621	0.631	0.641	0.65	0.659	0.668	0.676	0.685	0.694	0.702	0.712	0.72	0.728	0.736	0.745
0.11	0.601	0.607	0.614	0.622	0.631	0.639	0.648	0.657	0.666	0.674	0.682	0.689	0.698	0.706	0.713	0.722	0.729	0.737	0.745	0.753
0.12	0.621	0.626	0.632	0.639	0.647	0.654	0.662	0.671	0.679	0.686	0.694	0.7	0.709	0.716	0.723	0.731	0.738	0.745	0.752	0.760
0.13	0.641	0.646	0.651	0.657	0.664	0.67	0.678	0.685	0.692	0.699	0.706	0.712	0.72	0.727	0.733	0.741	0.747	0.754	0.761	0.768
0.14	0.66	0.664	0.668	0.674	0.68	0.686	0.692	0.699	0.705	0.711	0.718	0.723	0.73	0.737	0.742	0.75	0.756	0.762	0.768	0.775
0.15	0.678	0.682	0.685	0.69	0.695	0.701	0.706	0.712	0.718	0.724	0.73	0.734	0.741	0.747	0.752	0.759	0.765	0.77	0.776	0.782
0.16	0.695	0.698	0.701	0.705	0.71	0.715	0.72	0.725	0.731	0.736	0.741	0.746	0.752	0.757	0.762	0.769	0.774	0.779	0.785	0.791
0.17	0.71	0.712	0.715	0.718	0.723	0.727	0.731	0.737	0.742	0.746	0.751	0.755	0.761	0.766	0.771	0.776	0.781	0.786	0.791	0.797
0.18	0.723	0.725	0.728	0.731	0.735	0.739	0.743	0.747	0.752	0.756	0.76	0.764	0.769	0.774	0.778	0.784	0.788	0.793	0.798	0.803
0.19	0.738	0.739	0.741	0.744	0.747	0.751	0.754	0.759	0.763	0.766	0.77	0.774	0.779	0.783	0.787	0.792	0.796	0.801	0.805	0.810
0.2	0.75	0.752	0.753	0.756	0.759	0.762	0.765	0.769	0.773	0.776	0.78	0.783	0.787	0.792	0.795	0.8	0.804	0.808	0.812	0.816

Table E.85 Power Study: Sequential Test, n = 5 - H_0 : Gamma(3.5,1); H_a: Weibull(1,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.015	0.024	0.032	0.041	0.049	0.057	0.066	0.074	0.082	0.091	0.1	0.109	0.119	0.128	0.137	0.147	0.156	0.165	0.174	0.184
0.02	0.025	0.03	0.038	0.047	0.055	0.063	0.072	0.08	0.088	0.096	0.105	0.113	0.122	0.131	0.139	0.149	0.157	0.166	0.175	0.184
0.03	0.035	0.041	0.046	0.054	0.062	0.07	0.079	0.087	0.095	0.103	0.111	0.12	0.128	0.137	0.145	0.154	0.162	0.17	0.179	0.188
0.04	0.045	0.05	0.055	0.061	0.068	0.076	0.085	0.093	0.101	0.109	0.118	0.126	0.135	0.143	0.151	0.161	0.168	0.177	0.185	0.193
0.05	0.055	0.061	0.066	0.072	0.077	0.083	0.092	0.1	0.108	0.116	0.124	0.133	0.142	0.15	0.158	0.168	0.175	0.183	0.192	0.200
0.06	0.065	0.071	0.076	0.082	0.087	0.092	0.099	0.106	0.115	0.123	0.131	0.14	0.148	0.157	0.165	0.174	0.182	0.19	0.198	0.207
0.07	0.074	0.08	0.085	0.091	0.096	0.101	0.107	0.113	0.121	0.129	0.137	0.146	0.154	0.163	0.171	0.18	0.188	0.196	0.204	0.213
0.08	0.084	0.09	0.095	0.101	0.105	0.11	0.116	0.122	0.128	0.135	0.143	0.152	0.16	0.169	0.177	0.186	0.194	0.202	0.211	0.219
0.09	0.092	0.098	0.103	0.109	0.114	0.118	0.124	0.129	0.135	0.141	0.149	0.157	0.165	0.174	0.182	0.191	0.199	0.207	0.216	0.224
0.1	0.102	0.108	0.113	0.119	0.124	0.129	0.134	0.14	0.145	0.151	0.157	0.165	0.172	0.18	0.188	0.198	0.205	0.214	0.222	0.230
0.11	0.113	0.119	0.124	0.129	0.134	0.139	0.145	0.15	0.155	0.161	0.167	0.173	0.18	0.188	0.195	0.204	0.212	0.22	0.229	0.237
0.12	0.121	0.127	0.132	0.138	0.143	0.148	0.153	0.159	0.164	0.169	0.175	0.181	0.187	0.194	0.201	0.21	0.218	0.225	0.234	0.242
0.13	0.133	0.139	0.144	0.149	0.154	0.159	0.165	0.17	0.175	0.18	0.186	0.192	0.197	0.204	0.21	0.218	0.225	0.233	0.241	0.249
0.14	0.143	0.149	0.154	0.159	0.164	0.169	0.175	0.18	0.185	0.19	0.196	0.201	0.207	0.213	0.219	0.226	0.233	0.24	0.247	0.255
0.15	0.152	0.158	0.163	0.169	0.174	0.179	0.184	0.19	0.195	0.2	0.205	0.211	0.216	0.222	0.227	0.234	0.241	0.247	0.254	0.262
0.16	0.162	0.168	0.173	0.179	0.184	0.188	0.194	0.199	0.205	0.21	0.215	0.221	0.226	0.231	0.236	0.243	0.249	0.255	0.262	0.269
0.17	0.171	0.177	0.182	0.188	0.193	0.198	0.203	0.209	0.214	0.219	0.224	0.23	0.235	0.24	0.245	0.252	0.257	0.263	0.27	0.276
0.18	0.18	0.186	0.191	0.197	0.202	0.206	0.212	0.217	0.223	0.228	0.233	0.238	0.244	0.249	0.254	0.261	0.266	0.271	0.278	0.284
0.19	0.191	0.197	0.202	0.207	0.212	0.217	0.223	0.228	0.233	0.238	0.244	0.249	0.254	0.26	0.265	0.271	0.276	0.281	0.288	0.294
0.2	0.201	0.207	0.212	0.217	0.222	0.227	0.233	0.238	0.244	0.248	0.254	0.259	0.265	0.27	0.275	0.281	0.286	0.291	0.297	0.303

Table E.86 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a: Weibull(1,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.02	0.027	0.035	0.044	0.052	0.061	0.069	0.077	0.086	0.095	0.103	0.112	0.121	0.13	0.139	0.148	0.157	0.166	0.175	0.185
0.02	0.031	0.038	0.046	0.055	0.063	0.072	0.08	0.088	0.097	0.105	0.114	0.123	0.132	0.141	0.15	0.159	0.168	0.177	0.186	0.195
0.03	0.043	0.05	0.057	0.065	0.073	0.082	0.09	0.098	0.107	0.116	0.125	0.134	0.142	0.151	0.16	0.169	0.178	0.187	0.195	0.204
0.04	0.054	0.06	0.067	0.075	0.083	0.092	0.1	0.107	0.117	0.125	0.134	0.143	0.151	0.16	0.169	0.178	0.186	0.195	0.204	0.213
0.05	0.064	0.071	0.077	0.085	0.092	0.1	0.108	0.116	0.125	0.134	0.142	0.151	0.159	0.168	0.177	0.186	0.194	0.203	0.212	0.220
0.06	0.075	0.081	0.088	0.095	0.102	0.11	0.117	0.125	0.134	0.142	0.151	0.159	0.168	0.177	0.185	0.194	0.202	0.211	0.219	0.228
0.07	0.086	0.092	0.099	0.105	0.112	0.119	0.127	0.134	0.142	0.151	0.159	0.167	0.176	0.185	0.193	0.201	0.21	0.218	0.227	0.235
0.08	0.096	0.102	0.109	0.115	0.122	0.129	0.135	0.142	0.151	0.158	0.167	0.175	0.183	0.192	0.2	0.208	0.216	0.225	0.233	0.241
0.09	0.107	0.113	0.119	0.126	0.132	0.139	0.145	0.152	0.159	0.167	0.175	0.183	0.191	0.199	0.207	0.215	0.223	0.232	0.24	0.248
0.1	0.119	0.124	0.131	0.137	0.143	0.149	0.155	0.161	0.169	0.176	0.184	0.191	0.199	0.207	0.215	0.223	0.231	0.239	0.247	0.255
0.11	0.128	0.134	0.14	0.146	0.152	0.158	0.164	0.17	0.177	0.184	0.191	0.199	0.206	0.214	0.222	0.229	0.237	0.245	0.253	0.261
0.12	0.138	0.144	0.15	0.156	0.161	0.167	0.173	0.179	0.186	0.192	0.199	0.206	0.214	0.221	0.229	0.236	0.244	0.252	0.259	0.267
0.13	0.148	0.153	0.159	0.165	0.17	0.176	0.182	0.187	0.194	0.2	0.207	0.214	0.221	0.228	0.235	0.242	0.25	0.258	0.265	0.273
0.14	0.158	0.163	0.169	0.174	0.18	0.186	0.191	0.196	0.202	0.208	0.215	0.222	0.228	0.235	0.242	0.249	0.257	0.265	0.272	0.279
0.15	0.169	0.174	0.179	0.184	0.19	0.195	0.201	0.206	0.211	0.217	0.223	0.23	0.236	0.243	0.25	0.257	0.264	0.271	0.278	0.285
0.16	0.179	0.184	0.189	0.194	0.2	0.205	0.21	0.215	0.22	0.226	0.232	0.237	0.244	0.25	0.256	0.263	0.27	0.278	0.284	0.291
0.17	0.19	0.195	0.199	0.204	0.209	0.214	0.219	0.224	0.229	0.235	0.24	0.246	0.252	0.258	0.264	0.27	0.277	0.284	0.29	0.297
0.18	0.2	0.204	0.209	0.214	0.218	0.224	0.228	0.233	0.238	0.243	0.248	0.254	0.26	0.265	0.271	0.277	0.284	0.29	0.297	0.304
0.19	0.21	0.214	0.219	0.223	0.228	0.233	0.237	0.242	0.247	0.252	0.257	0.262	0.268	0.273	0.279	0.285	0.291	0.297	0.303	0.310
0.2	0.22	0.224	0.228	0.233	0.237	0.242	0.247	0.251	0.256	0.26	0.265	0.271	0.276	0.281	0.287	0.293	0.299	0.305	0.311	0.317

Table E.87 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a: Weibull(1,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.026	0.034	0.043	0.053	0.061	0.071	0.081	0.09	0.101	0.111	0.12	0.129	0.138	0.148	0.158	0.168	0.177	0.186	0.197	0.207
0.02	0.042	0.05	0.058	0.067	0.075	0.085	0.094	0.104	0.114	0.123	0.132	0.141	0.15	0.16	0.169	0.179	0.187	0.197	0.207	0.217
0.03	0.058	0.065	0.073	0.082	0.089	0.098	0.107	0.117	0.126	0.135	0.144	0.153	0.161	0.171	0.18	0.189	0.197	0.206	0.216	0.225
0.04	0.071	0.078	0.085	0.093	0.1	0.109	0.117	0.126	0.135	0.144	0.152	0.161	0.169	0.179	0.188	0.196	0.204	0.213	0.223	0.232
0.05	0.086	0.092	0.098	0.105	0.112	0.12	0.128	0.137	0.146	0.154	0.162	0.171	0.179	0.187	0.196	0.205	0.212	0.221	0.231	0.240
0.06	0.099	0.105	0.111	0.117	0.123	0.131	0.139	0.147	0.156	0.164	0.171	0.18	0.187	0.196	0.204	0.213	0.22	0.229	0.238	0.247
0.07	0.111	0.117	0.123	0.129	0.134	0.142	0.149	0.157	0.165	0.172	0.18	0.188	0.195	0.204	0.212	0.22	0.227	0.236	0.245	0.253
0.08	0.124	0.129	0.134	0.14	0.145	0.152	0.159	0.166	0.174	0.182	0.189	0.196	0.204	0.211	0.219	0.227	0.234	0.243	0.252	0.260
0.09	0.135	0.14	0.145	0.15	0.156	0.162	0.169	0.176	0.183	0.19	0.197	0.205	0.212	0.219	0.227	0.234	0.242	0.25	0.258	0.267
0.1	0.147	0.151	0.156	0.161	0.166	0.172	0.179	0.185	0.192	0.199	0.205	0.212	0.219	0.226	0.234	0.241	0.248	0.256	0.265	0.273
0.11	0.158	0.162	0.167	0.171	0.176	0.181	0.188	0.194	0.2	0.207	0.213	0.22	0.226	0.233	0.241	0.248	0.254	0.262	0.27	0.278
0.12	0.17	0.174	0.178	0.183	0.187	0.192	0.198	0.203	0.21	0.215	0.222	0.228	0.234	0.241	0.248	0.255	0.261	0.269	0.277	0.285
0.13	0.18	0.183	0.187	0.192	0.196	0.201	0.206	0.212	0.217	0.223	0.229	0.235	0.241	0.247	0.254	0.261	0.267	0.274	0.282	0.290
0.14	0.19	0.193	0.197	0.201	0.205	0.21	0.215	0.22	0.225	0.231	0.236	0.242	0.248	0.254	0.261	0.267	0.273	0.28	0.288	0.295
0.15	0.202	0.205	0.209	0.213	0.217	0.221	0.226	0.23	0.235	0.241	0.246	0.252	0.257	0.263	0.269	0.275	0.281	0.287	0.295	0.302
0.16	0.214	0.217	0.22	0.224	0.227	0.231	0.236	0.24	0.245	0.25	0.255	0.26	0.266	0.271	0.277	0.283	0.288	0.295	0.302	0.309
0.17	0.225	0.227	0.23	0.234	0.237	0.241	0.245	0.249	0.254	0.258	0.263	0.268	0.273	0.279	0.284	0.29	0.295	0.301	0.309	0.315
0.18	0.235	0.237	0.24	0.243	0.247	0.25	0.254	0.258	0.263	0.267	0.271	0.276	0.281	0.286	0.291	0.297	0.302	0.308	0.315	0.321
0.19	0.247	0.249	0.252	0.254	0.258	0.261	0.265	0.269	0.273	0.277	0.281	0.285	0.29	0.295	0.3	0.305	0.309	0.315	0.322	0.328
0.2	0.258	0.26	0.262	0.265	0.268	0.271	0.275	0.278	0.282	0.286	0.29	0.294	0.298	0.302	0.307	0.312	0.317	0.322	0.329	0.335

Table E.88 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a: Weibull(1,2)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.045	0.056	0.067	0.08	0.091	0.105	0.116	0.129	0.141	0.152	0.164	0.175	0.187	0.199	0.21	0.221	0.232	0.243	0.254	0.266
0.02	0.068	0.078	0.087	0.098	0.108	0.12	0.131	0.142	0.153	0.164	0.175	0.185	0.196	0.208	0.218	0.229	0.24	0.25	0.261	0.271
0.03	0.089	0.097	0.105	0.115	0.124	0.136	0.145	0.156	0.166	0.175	0.186	0.196	0.206	0.217	0.227	0.237	0.248	0.257	0.268	0.278
0.04	0.109	0.115	0.122	0.131	0.139	0.149	0.158	0.168	0.177	0.187	0.196	0.206	0.216	0.226	0.235	0.245	0.255	0.265	0.274	0.284
0.05	0.128	0.134	0.139	0.147	0.155	0.164	0.172	0.181	0.19	0.199	0.208	0.216	0.225	0.235	0.244	0.254	0.263	0.272	0.282	0.291
0.06	0.147	0.152	0.157	0.164	0.17	0.179	0.186	0.195	0.203	0.211	0.219	0.227	0.236	0.246	0.254	0.263	0.272	0.281	0.29	0.299
0.07	0.165	0.169	0.173	0.179	0.185	0.193	0.2	0.208	0.215	0.222	0.23	0.238	0.246	0.255	0.263	0.272	0.281	0.289	0.297	0.306
0.08	0.181	0.184	0.188	0.193	0.199	0.206	0.213	0.22	0.226	0.233	0.241	0.248	0.256	0.264	0.271	0.28	0.288	0.296	0.305	0.313
0.09	0.196	0.199	0.202	0.207	0.212	0.219	0.225	0.231	0.237	0.244	0.251	0.258	0.265	0.273	0.28	0.288	0.296	0.303	0.312	0.320
0.1	0.211	0.213	0.216	0.221	0.225	0.231	0.236	0.242	0.248	0.254	0.261	0.267	0.274	0.281	0.288	0.296	0.303	0.311	0.318	0.326
0.11	0.225	0.227	0.23	0.234	0.238	0.244	0.248	0.254	0.259	0.265	0.271	0.277	0.283	0.291	0.297	0.304	0.311	0.318	0.326	0.333
0.12	0.239	0.241	0.244	0.247	0.251	0.256	0.26	0.265	0.27	0.276	0.281	0.287	0.293	0.3	0.306	0.313	0.319	0.326	0.333	0.340
0.13	0.254	0.256	0.258	0.261	0.264	0.269	0.272	0.277	0.282	0.287	0.292	0.297	0.303	0.31	0.315	0.322	0.328	0.334	0.341	0.348
0.14	0.268	0.269	0.271	0.274	0.277	0.281	0.284	0.289	0.293	0.297	0.303	0.307	0.312	0.319	0.324	0.33	0.336	0.342	0.349	0.355
0.15	0.282	0.283	0.284	0.287	0.289	0.293	0.296	0.3	0.304	0.308	0.313	0.318	0.322	0.328	0.333	0.339	0.344	0.35	0.357	0.363
0.16	0.296	0.297	0.298	0.3	0.303	0.306	0.309	0.312	0.315	0.319	0.324	0.328	0.332	0.338	0.342	0.348	0.353	0.359	0.364	0.370
0.17	0.31	0.31	0.312	0.314	0.316	0.318	0.321	0.324	0.327	0.331	0.335	0.338	0.342	0.347	0.352	0.357	0.362	0.367	0.372	0.378
0.18	0.322	0.322	0.323	0.325	0.327	0.329	0.331	0.334	0.337	0.34	0.344	0.347	0.351	0.356	0.36	0.365	0.37	0.374	0.38	0.385
0.19	0.334	0.334	0.335	0.337	0.338	0.34	0.342	0.345	0.347	0.351	0.354	0.357	0.361	0.365	0.369	0.373	0.378	0.383	0.388	0.393
0.2	0.346	0.347	0.348	0.349	0.35	0.352	0.354	0.356	0.358	0.361	0.365	0.367	0.371	0.375	0.378	0.383	0.387	0.391	0.396	0.401

Table E.89 Power Study: Sequential Test, n = 5 - H_0 : Gamma(3.5,1); H_a: Norm(0,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.02	0.026	0.032	0.038	0.044	0.05	0.057	0.064	0.07	0.077	0.085	0.093	0.101	0.108	0.116	0.126	0.134	0.143	0.152	0.160
0.02	0.035	0.039	0.045	0.051	0.057	0.063	0.07	0.077	0.082	0.088	0.095	0.101	0.108	0.114	0.121	0.129	0.136	0.145	0.153	0.161
0.03	0.048	0.052	0.057	0.063	0.069	0.075	0.082	0.088	0.094	0.1	0.107	0.113	0.12	0.126	0.131	0.139	0.146	0.153	0.161	0.168
0.04	0.062	0.066	0.071	0.076	0.081	0.087	0.094	0.1	0.106	0.112	0.119	0.125	0.132	0.137	0.143	0.151	0.157	0.165	0.172	0.179
0.05	0.075	0.079	0.084	0.089	0.093	0.099	0.106	0.112	0.118	0.124	0.131	0.137	0.143	0.149	0.155	0.163	0.169	0.177	0.184	0.190
0.06	0.087	0.092	0.096	0.101	0.106	0.111	0.117	0.123	0.129	0.135	0.141	0.148	0.154	0.16	0.166	0.173	0.18	0.187	0.194	0.201
0.07	0.1	0.104	0.109	0.114	0.118	0.123	0.129	0.134	0.14	0.145	0.152	0.159	0.165	0.171	0.177	0.184	0.191	0.198	0.205	0.212
0.08	0.114	0.118	0.123	0.127	0.132	0.137	0.142	0.147	0.152	0.157	0.164	0.17	0.176	0.182	0.188	0.196	0.202	0.21	0.217	0.223
0.09	0.125	0.129	0.134	0.139	0.143	0.148	0.154	0.159	0.163	0.168	0.174	0.18	0.186	0.192	0.198	0.205	0.212	0.219	0.226	0.233
0.1	0.136	0.14	0.145	0.15	0.154	0.159	0.164	0.169	0.174	0.178	0.184	0.19	0.195	0.201	0.207	0.214	0.221	0.228	0.235	0.242
0.11	0.148	0.153	0.157	0.162	0.167	0.172	0.177	0.182	0.186	0.19	0.196	0.201	0.207	0.212	0.218	0.225	0.231	0.239	0.246	0.253
0.12	0.161	0.165	0.17	0.174	0.179	0.184	0.189	0.194	0.198	0.202	0.208	0.213	0.218	0.223	0.228	0.235	0.242	0.249	0.256	0.263
0.13	0.173	0.178	0.182	0.187	0.192	0.197	0.202	0.207	0.211	0.215	0.22	0.225	0.23	0.235	0.24	0.246	0.253	0.26	0.267	0.273
0.14	0.185	0.19	0.195	0.199	0.204	0.209	0.214	0.219	0.223	0.227	0.233	0.237	0.242	0.246	0.251	0.257	0.263	0.27	0.277	0.283
0.15	0.197	0.201	0.206	0.21	0.215	0.22	0.225	0.23	0.234	0.238	0.244	0.248	0.253	0.257	0.262	0.268	0.274	0.28	0.287	0.293
0.16	0.208	0.212	0.217	0.222	0.226	0.231	0.236	0.241	0.245	0.249	0.255	0.259	0.264	0.268	0.273	0.279	0.284	0.29	0.297	0.302
0.17	0.218	0.222	0.227	0.232	0.236	0.241	0.246	0.251	0.255	0.26	0.265	0.27	0.274	0.278	0.283	0.288	0.294	0.3	0.306	0.311
0.18	0.228	0.233	0.237	0.242	0.246	0.252	0.257	0.262	0.266	0.27	0.275	0.28	0.284	0.289	0.293	0.298	0.304	0.31	0.316	0.321
0.19	0.238	0.243	0.248	0.252	0.257	0.262	0.267	0.272	0.276	0.28	0.286	0.29	0.295	0.299	0.303	0.309	0.314	0.32	0.326	0.331
0.2	0.25	0.254	0.259	0.264	0.268	0.273	0.278	0.283	0.287	0.291	0.297	0.301	0.306	0.31	0.314	0.32	0.325	0.33	0.336	0.341

Table E.90 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a: Norm(0,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.119	0.124	0.128	0.134	0.139	0.145	0.15	0.155	0.161	0.166	0.172	0.178	0.185	0.191	0.197	0.204	0.211	0.217	0.222	0.229
0.02	0.167	0.171	0.176	0.181	0.187	0.193	0.197	0.203	0.208	0.214	0.22	0.226	0.232	0.238	0.244	0.251	0.258	0.264	0.269	0.276
0.03	0.207	0.211	0.216	0.221	0.226	0.232	0.236	0.242	0.247	0.253	0.258	0.265	0.27	0.277	0.283	0.289	0.296	0.302	0.307	0.314
0.04	0.236	0.241	0.245	0.25	0.255	0.261	0.266	0.271	0.276	0.282	0.287	0.293	0.299	0.305	0.311	0.317	0.324	0.329	0.335	0.341
0.05	0.263	0.267	0.271	0.276	0.281	0.287	0.291	0.296	0.301	0.307	0.312	0.318	0.324	0.33	0.336	0.342	0.348	0.353	0.358	0.364
0.06	0.289	0.293	0.297	0.302	0.306	0.312	0.316	0.321	0.326	0.331	0.337	0.342	0.348	0.353	0.359	0.365	0.371	0.376	0.381	0.387
0.07	0.311	0.315	0.319	0.324	0.328	0.333	0.337	0.342	0.347	0.352	0.357	0.362	0.368	0.373	0.379	0.384	0.39	0.395	0.4	0.406
0.08	0.332	0.336	0.34	0.344	0.348	0.353	0.357	0.362	0.366	0.371	0.376	0.381	0.386	0.392	0.397	0.403	0.408	0.413	0.418	0.423
0.09	0.351	0.355	0.359	0.363	0.367	0.372	0.375	0.38	0.384	0.389	0.394	0.399	0.404	0.409	0.414	0.42	0.425	0.43	0.434	0.440
0.1	0.368	0.372	0.376	0.38	0.384	0.388	0.392	0.396	0.4	0.405	0.409	0.414	0.419	0.424	0.429	0.434	0.439	0.444	0.448	0.454
0.11	0.384	0.388	0.391	0.395	0.399	0.403	0.407	0.411	0.415	0.42	0.424	0.428	0.433	0.438	0.443	0.448	0.453	0.458	0.462	0.467
0.12	0.401	0.404	0.408	0.411	0.415	0.419	0.422	0.426	0.43	0.434	0.438	0.443	0.447	0.452	0.457	0.462	0.467	0.471	0.475	0.480
0.13	0.416	0.419	0.423	0.426	0.43	0.434	0.437	0.441	0.444	0.448	0.452	0.456	0.461	0.465	0.47	0.475	0.479	0.484	0.488	0.493
0.14	0.43	0.433	0.436	0.44	0.443	0.447	0.45	0.453	0.457	0.461	0.465	0.469	0.473	0.478	0.482	0.487	0.491	0.495	0.499	0.504
0.15	0.445	0.448	0.451	0.455	0.458	0.461	0.464	0.468	0.471	0.475	0.478	0.482	0.486	0.491	0.495	0.499	0.503	0.508	0.511	0.516
0.16	0.459	0.462	0.465	0.468	0.471	0.474	0.476	0.48	0.483	0.486	0.49	0.494	0.497	0.502	0.506	0.51	0.514	0.518	0.522	0.526
0.17	0.471	0.474	0.477	0.479	0.482	0.486	0.488	0.491	0.494	0.497	0.501	0.504	0.508	0.512	0.516	0.52	0.524	0.528	0.531	0.536
0.18	0.484	0.486	0.489	0.492	0.494	0.497	0.5	0.503	0.506	0.509	0.512	0.515	0.519	0.523	0.526	0.53	0.534	0.538	0.541	0.545
0.19	0.495	0.498	0.5	0.503	0.505	0.508	0.51	0.513	0.516	0.519	0.522	0.525	0.529	0.533	0.536	0.54	0.544	0.547	0.55	0.554
0.2	0.507	0.509	0.511	0.514	0.516	0.519	0.521	0.524	0.527	0.53	0.532	0.536	0.539	0.543	0.546	0.55	0.553	0.557	0.56	0.564

Table E.91 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a: Norm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.247	0.252	0.256	0.262	0.267	0.273	0.279	0.284	0.291	0.297	0.302	0.308	0.313	0.319	0.325	0.332	0.338	0.344	0.351	0.358
0.02	0.326	0.33	0.334	0.339	0.344	0.349	0.354	0.359	0.365	0.37	0.376	0.38	0.385	0.391	0.396	0.402	0.408	0.413	0.418	0.425
0.03	0.381	0.384	0.388	0.393	0.396	0.402	0.406	0.41	0.416	0.421	0.425	0.43	0.434	0.439	0.444	0.449	0.454	0.459	0.464	0.470
0.04	0.419	0.422	0.426	0.43	0.433	0.438	0.442	0.446	0.451	0.455	0.459	0.463	0.467	0.472	0.476	0.481	0.486	0.49	0.495	0.500
0.05	0.453	0.456	0.459	0.463	0.466	0.47	0.474	0.477	0.482	0.486	0.49	0.493	0.497	0.501	0.506	0.51	0.514	0.518	0.522	0.527
0.06	0.483	0.485	0.488	0.491	0.494	0.498	0.501	0.504	0.508	0.512	0.516	0.519	0.523	0.527	0.531	0.534	0.538	0.542	0.546	0.551
0.07	0.507	0.509	0.511	0.514	0.517	0.52	0.523	0.526	0.53	0.533	0.537	0.54	0.543	0.547	0.551	0.554	0.558	0.561	0.565	0.569
0.08	0.527	0.529	0.531	0.534	0.536	0.539	0.542	0.545	0.548	0.551	0.554	0.557	0.56	0.564	0.567	0.571	0.574	0.578	0.581	0.585
0.09	0.548	0.549	0.552	0.554	0.556	0.559	0.562	0.564	0.567	0.57	0.573	0.576	0.578	0.582	0.585	0.588	0.591	0.594	0.598	0.602
0.1	0.564	0.566	0.568	0.57	0.572	0.574	0.577	0.579	0.582	0.584	0.587	0.589	0.592	0.595	0.598	0.601	0.604	0.607	0.61	0.614
0.11	0.581	0.582	0.584	0.586	0.588	0.59	0.592	0.594	0.597	0.599	0.602	0.604	0.606	0.609	0.612	0.615	0.618	0.62	0.623	0.627
0.12	0.597	0.598	0.6	0.602	0.603	0.605	0.607	0.609	0.611	0.614	0.616	0.618	0.62	0.623	0.626	0.628	0.631	0.633	0.636	0.640
0.13	0.61	0.611	0.613	0.614	0.616	0.617	0.619	0.621	0.624	0.626	0.628	0.63	0.632	0.635	0.637	0.639	0.642	0.644	0.647	0.650
0.14	0.624	0.625	0.626	0.628	0.629	0.631	0.632	0.634	0.636	0.638	0.64	0.642	0.644	0.646	0.648	0.65	0.653	0.655	0.657	0.661
0.15	0.636	0.637	0.639	0.64	0.641	0.643	0.644	0.646	0.648	0.65	0.651	0.653	0.655	0.657	0.659	0.661	0.663	0.666	0.668	0.671
0.16	0.648	0.649	0.65	0.652	0.653	0.654	0.656	0.657	0.659	0.66	0.662	0.664	0.665	0.667	0.67	0.671	0.674	0.675	0.678	0.680
0.17	0.659	0.66	0.661	0.662	0.663	0.664	0.666	0.667	0.669	0.67	0.672	0.673	0.675	0.676	0.679	0.68	0.682	0.684	0.686	0.689
0.18	0.669	0.67	0.671	0.672	0.673	0.674	0.675	0.676	0.678	0.679	0.681	0.682	0.683	0.685	0.687	0.688	0.69	0.692	0.694	0.696
0.19	0.68	0.68	0.681	0.682	0.683	0.684	0.685	0.686	0.687	0.689	0.69	0.691	0.692	0.694	0.696	0.697	0.699	0.701	0.703	0.705
0.2	0.689	0.689	0.69	0.691	0.692	0.692	0.694	0.695	0.696	0.697	0.698	0.699	0.701	0.702	0.704	0.705	0.707	0.708	0.71	0.712

Table E.92 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a: Norm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.558	0.561	0.563	0.567	0.571	0.575	0.579	0.584	0.588	0.592	0.597	0.601	0.605	0.61	0.615	0.62	0.625	0.63	0.635	0.641
0.02	0.641	0.643	0.645	0.647	0.65	0.652	0.656	0.659	0.662	0.665	0.668	0.671	0.674	0.677	0.681	0.684	0.688	0.692	0.695	0.699
0.03	0.691	0.693	0.694	0.696	0.697	0.699	0.702	0.704	0.706	0.708	0.711	0.713	0.716	0.718	0.721	0.724	0.727	0.729	0.732	0.736
0.04	0.728	0.729	0.729	0.731	0.732	0.733	0.735	0.737	0.739	0.74	0.743	0.744	0.746	0.748	0.75	0.753	0.755	0.757	0.759	0.762
0.05	0.754	0.755	0.755	0.757	0.757	0.759	0.76	0.762	0.763	0.764	0.766	0.767	0.769	0.771	0.773	0.775	0.776	0.778	0.78	0.782
0.06	0.778	0.778	0.779	0.78	0.78	0.781	0.782	0.783	0.784	0.786	0.787	0.788	0.789	0.791	0.792	0.794	0.796	0.797	0.799	0.801
0.07	0.795	0.795	0.795	0.796	0.797	0.797	0.798	0.799	0.8	0.801	0.803	0.803	0.805	0.806	0.807	0.809	0.81	0.811	0.813	0.815
0.08	0.81	0.81	0.81	0.811	0.811	0.812	0.812	0.813	0.814	0.815	0.816	0.817	0.818	0.819	0.82	0.821	0.823	0.824	0.825	0.826
0.09	0.822	0.822	0.823	0.823	0.823	0.824	0.824	0.825	0.826	0.827	0.828	0.828	0.829	0.83	0.831	0.832	0.833	0.834	0.836	0.837
0.1	0.833	0.833	0.834	0.834	0.834	0.835	0.835	0.836	0.836	0.837	0.838	0.838	0.839	0.84	0.841	0.842	0.843	0.843	0.845	0.846
0.11	0.843	0.843	0.844	0.844	0.844	0.845	0.845	0.845	0.846	0.846	0.847	0.848	0.848	0.849	0.85	0.851	0.852	0.852	0.853	0.855
0.12	0.852	0.852	0.852	0.852	0.853	0.853	0.853	0.854	0.854	0.855	0.855	0.856	0.856	0.857	0.858	0.858	0.859	0.86	0.861	0.862
0.13	0.86	0.86	0.861	0.861	0.861	0.861	0.862	0.862	0.862	0.863	0.863	0.864	0.864	0.865	0.866	0.866	0.867	0.867	0.868	0.869
0.14	0.868	0.868	0.868	0.868	0.868	0.869	0.869	0.869	0.87	0.87	0.871	0.871	0.871	0.872	0.872	0.873	0.874	0.874	0.875	0.876
0.15	0.875	0.875	0.875	0.875	0.875	0.875	0.875	0.876	0.876	0.876	0.877	0.877	0.877	0.878	0.878	0.879	0.879	0.88	0.881	0.882
0.16	0.882	0.882	0.882	0.882	0.882	0.882	0.882	0.883	0.883	0.883	0.883	0.884	0.884	0.884	0.885	0.885	0.886	0.886	0.887	0.888
0.17	0.887	0.887	0.887	0.887	0.888	0.888	0.888	0.888	0.888	0.888	0.889	0.889	0.889	0.89	0.89	0.891	0.891	0.891	0.892	0.893
0.18	0.892	0.892	0.892	0.892	0.893	0.893	0.893	0.893	0.893	0.893	0.894	0.894	0.894	0.895	0.895	0.895	0.896	0.896	0.896	0.897
0.19	0.897	0.897	0.897	0.897	0.897	0.898	0.898	0.898	0.898	0.898	0.898	0.899	0.899	0.899	0.9	0.9	0.9	0.9	0.901	0.902
0.2	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.903	0.903	0.903	0.903	0.903	0.903	0.904	0.904	0.904	0.905	0.905	0.905	0.906

Table E.93 Power Study: Sequential Test, n = 5 - H_0 : Gamma(3.5,1); H_a: Unif(0,2)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.029	0.04	0.051	0.062	0.072	0.082	0.092	0.104	0.112	0.123	0.134	0.145	0.156	0.167	0.178	0.188	0.199	0.21	0.221	0.232
0.02	0.044	0.054	0.065	0.075	0.085	0.095	0.106	0.117	0.125	0.135	0.144	0.154	0.164	0.173	0.182	0.191	0.202	0.212	0.222	0.232
0.03	0.057	0.067	0.076	0.086	0.096	0.106	0.117	0.128	0.136	0.146	0.155	0.165	0.175	0.183	0.192	0.201	0.211	0.22	0.23	0.239
0.04	0.069	0.08	0.089	0.098	0.107	0.117	0.128	0.139	0.147	0.157	0.166	0.176	0.185	0.194	0.203	0.212	0.222	0.231	0.24	0.249
0.05	0.082	0.092	0.102	0.111	0.12	0.129	0.139	0.15	0.159	0.168	0.178	0.188	0.197	0.206	0.215	0.224	0.233	0.242	0.252	0.260
0.06	0.093	0.103	0.112	0.122	0.13	0.139	0.149	0.159	0.168	0.177	0.187	0.197	0.206	0.215	0.224	0.232	0.242	0.251	0.261	0.269
0.07	0.103	0.113	0.122	0.132	0.14	0.148	0.158	0.168	0.176	0.185	0.195	0.205	0.214	0.223	0.232	0.241	0.25	0.259	0.269	0.277
0.08	0.115	0.125	0.134	0.144	0.152	0.16	0.17	0.179	0.187	0.196	0.205	0.215	0.224	0.233	0.242	0.251	0.26	0.269	0.279	0.287
0.09	0.124	0.135	0.144	0.153	0.162	0.17	0.179	0.189	0.196	0.204	0.213	0.223	0.232	0.241	0.25	0.259	0.268	0.277	0.287	0.295
0.1	0.134	0.145	0.154	0.163	0.172	0.18	0.189	0.199	0.206	0.214	0.223	0.232	0.241	0.249	0.258	0.267	0.276	0.285	0.295	0.303
0.11	0.145	0.155	0.164	0.174	0.182	0.19	0.2	0.209	0.216	0.224	0.233	0.241	0.25	0.258	0.267	0.275	0.285	0.294	0.303	0.312
0.12	0.155	0.165	0.175	0.184	0.193	0.201	0.21	0.219	0.226	0.234	0.243	0.251	0.259	0.267	0.276	0.284	0.293	0.302	0.312	0.320
0.13	0.165	0.175	0.185	0.194	0.203	0.211	0.22	0.229	0.236	0.244	0.253	0.261	0.269	0.277	0.285	0.293	0.302	0.311	0.32	0.329
0.14	0.176	0.187	0.196	0.205	0.214	0.222	0.231	0.241	0.248	0.256	0.264	0.272	0.28	0.287	0.295	0.303	0.312	0.32	0.329	0.338
0.15	0.186	0.197	0.206	0.215	0.224	0.232	0.241	0.251	0.258	0.266	0.274	0.282	0.29	0.297	0.305	0.313	0.321	0.329	0.338	0.346
0.16	0.195	0.206	0.215	0.224	0.233	0.241	0.25	0.26	0.267	0.275	0.283	0.291	0.299	0.306	0.313	0.321	0.329	0.337	0.346	0.354
0.17	0.205	0.215	0.224	0.233	0.242	0.25	0.26	0.269	0.276	0.284	0.292	0.3	0.308	0.315	0.322	0.33	0.338	0.346	0.355	0.362
0.18	0.214	0.224	0.233	0.242	0.251	0.259	0.269	0.278	0.285	0.293	0.301	0.309	0.317	0.324	0.331	0.339	0.347	0.355	0.363	0.370
0.19	0.224	0.234	0.243	0.253	0.261	0.269	0.279	0.288	0.295	0.303	0.311	0.32	0.327	0.334	0.342	0.349	0.357	0.365	0.373	0.380
0.2	0.235	0.246	0.255	0.264	0.273	0.281	0.29	0.3	0.307	0.315	0.323	0.331	0.339	0.345	0.353	0.36	0.368	0.376	0.384	0.391

Table E.94 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a: Unif(0,2)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.118	0.159	0.195	0.227	0.258	0.285	0.307	0.329	0.351	0.371	0.39	0.409	0.427	0.442	0.459	0.474	0.488	0.503	0.516	0.528
0.02	0.159	0.2	0.235	0.268	0.298	0.325	0.346	0.368	0.389	0.409	0.428	0.446	0.464	0.479	0.494	0.509	0.523	0.537	0.55	0.562
0.03	0.197	0.238	0.273	0.304	0.333	0.359	0.381	0.401	0.422	0.441	0.459	0.477	0.494	0.508	0.523	0.537	0.55	0.563	0.576	0.587
0.04	0.23	0.27	0.303	0.334	0.362	0.387	0.408	0.428	0.448	0.466	0.484	0.501	0.517	0.531	0.545	0.558	0.571	0.584	0.595	0.606
0.05	0.259	0.298	0.331	0.361	0.388	0.412	0.432	0.451	0.47	0.488	0.504	0.521	0.536	0.549	0.563	0.576	0.587	0.6	0.611	0.622
0.06	0.287	0.325	0.357	0.386	0.412	0.435	0.454	0.472	0.491	0.507	0.523	0.539	0.554	0.566	0.58	0.592	0.603	0.615	0.626	0.635
0.07	0.312	0.349	0.38	0.407	0.432	0.454	0.473	0.491	0.508	0.524	0.54	0.555	0.569	0.581	0.594	0.606	0.616	0.628	0.638	0.647
0.08	0.335	0.37	0.4	0.426	0.45	0.472	0.49	0.506	0.524	0.539	0.554	0.568	0.582	0.593	0.605	0.617	0.627	0.638	0.648	0.657
0.09	0.356	0.39	0.419	0.444	0.467	0.488	0.505	0.521	0.538	0.552	0.566	0.581	0.593	0.604	0.616	0.628	0.637	0.648	0.658	0.666
0.1	0.377	0.409	0.437	0.461	0.483	0.502	0.519	0.534	0.55	0.564	0.578	0.592	0.604	0.615	0.626	0.637	0.647	0.657	0.666	0.675
0.11	0.396	0.427	0.454	0.476	0.497	0.516	0.532	0.547	0.562	0.576	0.589	0.602	0.614	0.625	0.636	0.646	0.655	0.665	0.674	0.682
0.12	0.414	0.443	0.469	0.491	0.511	0.529	0.545	0.559	0.574	0.586	0.599	0.612	0.624	0.634	0.644	0.654	0.663	0.672	0.681	0.689
0.13	0.429	0.458	0.483	0.504	0.523	0.541	0.556	0.57	0.583	0.596	0.608	0.621	0.632	0.642	0.652	0.661	0.669	0.679	0.687	0.695
0.14	0.446	0.474	0.497	0.517	0.535	0.552	0.567	0.58	0.593	0.605	0.617	0.629	0.64	0.65	0.66	0.669	0.677	0.686	0.694	0.701
0.15	0.463	0.489	0.511	0.53	0.548	0.564	0.578	0.591	0.603	0.615	0.626	0.638	0.649	0.658	0.667	0.676	0.684	0.692	0.7	0.707
0.16	0.478	0.503	0.524	0.542	0.559	0.575	0.588	0.6	0.613	0.624	0.635	0.646	0.656	0.665	0.674	0.683	0.691	0.699	0.706	0.713
0.17	0.493	0.517	0.537	0.554	0.57	0.585	0.598	0.61	0.622	0.633	0.643	0.654	0.664	0.672	0.681	0.69	0.697	0.705	0.712	0.719
0.18	0.507	0.53	0.549	0.566	0.581	0.596	0.608	0.619	0.63	0.641	0.651	0.662	0.671	0.679	0.688	0.696	0.703	0.711	0.718	0.725
0.19	0.521	0.542	0.561	0.576	0.591	0.605	0.617	0.627	0.638	0.648	0.658	0.668	0.677	0.685	0.694	0.702	0.709	0.716	0.723	0.729
0.2	0.533	0.554	0.572	0.587	0.601	0.614	0.626	0.636	0.646	0.656	0.666	0.675	0.684	0.692	0.7	0.708	0.714	0.722	0.728	0.735

Table E.95 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a: Unif(0,2)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.343	0.423	0.487	0.533	0.57	0.603	0.633	0.659	0.683	0.704	0.721	0.737	0.751	0.765	0.778	0.79	0.801	0.812	0.824	0.832
	0.02	0.418	0.489	0.545	0.585	0.617	0.646	0.673	0.696	0.718	0.736	0.751	0.765	0.777	0.79	0.802	0.812	0.822	0.832	0.842	0.850
	0.03	0.472	0.535	0.585	0.621	0.65	0.676	0.7	0.721	0.74	0.757	0.771	0.783	0.794	0.805	0.816	0.826	0.835	0.844	0.853	0.860
	0.04	0.51	0.567	0.612	0.645	0.672	0.695	0.717	0.737	0.755	0.77	0.783	0.795	0.805	0.815	0.826	0.835	0.843	0.851	0.86	0.867
	0.05	0.542	0.594	0.634	0.665	0.689	0.711	0.731	0.749	0.766	0.78	0.792	0.803	0.813	0.823	0.833	0.841	0.849	0.857	0.865	0.872
	0.06	0.571	0.619	0.655	0.683	0.706	0.726	0.745	0.762	0.777	0.79	0.802	0.812	0.821	0.83	0.84	0.848	0.856	0.863	0.871	0.877
	0.07	0.596	0.639	0.673	0.699	0.72	0.738	0.756	0.772	0.786	0.799	0.81	0.82	0.828	0.837	0.846	0.853	0.861	0.868	0.875	0.881
	0.08	0.616	0.656	0.687	0.712	0.732	0.749	0.766	0.781	0.794	0.806	0.817	0.826	0.834	0.842	0.851	0.858	0.865	0.872	0.879	0.885
	0.09	0.636	0.672	0.702	0.724	0.743	0.76	0.775	0.789	0.802	0.813	0.823	0.832	0.839	0.848	0.856	0.863	0.869	0.876	0.882	0.888
	0.1	0.654	0.688	0.716	0.736	0.754	0.769	0.784	0.798	0.81	0.82	0.829	0.837	0.845	0.853	0.861	0.867	0.873	0.88	0.886	0.891
	0.11	0.67	0.701	0.727	0.747	0.764	0.778	0.792	0.805	0.817	0.826	0.835	0.843	0.85	0.858	0.865	0.872	0.878	0.884	0.89	0.895
	0.12	0.684	0.713	0.737	0.756	0.772	0.786	0.799	0.811	0.822	0.831	0.84	0.847	0.854	0.861	0.869	0.875	0.881	0.886	0.892	0.897
	0.13	0.698	0.725	0.747	0.764	0.78	0.793	0.805	0.817	0.827	0.836	0.844	0.851	0.858	0.865	0.872	0.878	0.884	0.889	0.895	0.900
	0.14	0.711	0.736	0.757	0.773	0.787	0.799	0.811	0.822	0.832	0.841	0.849	0.856	0.862	0.869	0.875	0.881	0.886	0.892	0.897	0.902
	0.15	0.724	0.747	0.767	0.782	0.795	0.806	0.818	0.828	0.838	0.846	0.853	0.86	0.866	0.872	0.879	0.884	0.889	0.894	0.899	0.904
	0.16	0.737	0.758	0.776	0.79	0.803	0.814	0.824	0.834	0.843	0.851	0.858	0.864	0.87	0.876	0.882	0.887	0.892	0.897	0.902	0.907
	0.17	0.747	0.767	0.784	0.797	0.809	0.819	0.829	0.839	0.847	0.854	0.861	0.867	0.873	0.879	0.885	0.889	0.894	0.899	0.904	0.908
	0.18	0.757	0.776	0.792	0.804	0.815	0.825	0.835	0.843	0.851	0.858	0.865	0.871	0.876	0.882	0.887	0.892	0.897	0.901	0.906	0.910
	0.19	0.767	0.785	0.8	0.811	0.821	0.831	0.84	0.848	0.856	0.862	0.869	0.874	0.879	0.885	0.89	0.895	0.899	0.904	0.908	0.912
	0.2	0.778	0.794	0.808	0.818	0.828	0.837	0.845	0.853	0.86	0.866	0.873	0.878	0.883	0.888	0.893	0.897	0.902	0.906	0.91	0.914

Table E.96 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a: Unif(0,2)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.869	0.914	0.938	0.953	0.964	0.971	0.977	0.981	0.984	0.986	0.989	0.99	0.992	0.993	0.994	0.995	0.995	0.996	0.996	0.997
	0.02	0.895	0.93	0.949	0.96	0.969	0.975	0.98	0.984	0.986	0.988	0.99	0.991	0.993	0.994	0.995	0.995	0.996	0.996	0.997	0.997
	0.03	0.91	0.938	0.954	0.964	0.972	0.978	0.982	0.985	0.987	0.989	0.991	0.992	0.993	0.994	0.995	0.996	0.996	0.997	0.997	0.997
	0.04	0.922	0.945	0.959	0.968	0.974	0.979	0.983	0.986	0.988	0.99	0.991	0.992	0.994	0.995	0.995	0.996	0.996	0.997	0.997	0.997
	0.05	0.931	0.95	0.962	0.97	0.976	0.981	0.984	0.987	0.989	0.99	0.992	0.993	0.994	0.995	0.996	0.996	0.997	0.997	0.997	0.998
	0.06	0.939	0.955	0.966	0.973	0.978	0.982	0.986	0.988	0.99	0.991	0.992	0.994	0.994	0.995	0.996	0.996	0.997	0.997	0.997	0.998
	0.07	0.945	0.959	0.968	0.975	0.98	0.984	0.987	0.989	0.991	0.992	0.993	0.994	0.995	0.996	0.996	0.997	0.997	0.997	0.998	0.998
	0.08	0.951	0.963	0.971	0.977	0.981	0.985	0.988	0.99	0.991	0.992	0.993	0.994	0.995	0.996	0.996	0.997	0.997	0.998	0.998	0.998
	0.09	0.955	0.965	0.973	0.978	0.982	0.986	0.988	0.99	0.991	0.993	0.994	0.995	0.995	0.996	0.996	0.997	0.997	0.998	0.998	0.998
	0.1	0.959	0.968	0.975	0.98	0.984	0.987	0.989	0.991	0.992	0.993	0.994	0.995	0.996	0.996	0.997	0.997	0.997	0.998	0.998	0.998
	0.11	0.963	0.971	0.977	0.981	0.985	0.987	0.99	0.991	0.992	0.993	0.994	0.995	0.996	0.996	0.997	0.997	0.997	0.998	0.998	0.998
	0.12	0.966	0.973	0.979	0.983	0.986	0.988	0.99	0.992	0.993	0.994	0.995	0.995	0.996	0.996	0.997	0.997	0.998	0.998	0.998	0.998
	0.13	0.969	0.976	0.98	0.984	0.987	0.989	0.991	0.992	0.993	0.994	0.995	0.995	0.996	0.996	0.997	0.997	0.998	0.998	0.998	0.998
	0.14	0.972	0.977	0.982	0.985	0.988	0.99	0.991	0.993	0.993	0.994	0.995	0.996	0.996	0.997	0.997	0.997	0.998	0.998	0.998	0.998
	0.15	0.975	0.979	0.983	0.986	0.988	0.99	0.992	0.993	0.994	0.994	0.995	0.996	0.996	0.997	0.997	0.997	0.998	0.998	0.998	0.998
	0.16	0.977	0.981	0.984	0.987	0.989	0.991	0.992	0.993	0.994	0.995	0.995	0.996	0.996	0.997	0.997	0.997	0.998	0.998	0.998	0.998
	0.17	0.979	0.982	0.985	0.988	0.99	0.992	0.993	0.994	0.994	0.995	0.996	0.996	0.997	0.997	0.997	0.998	0.998	0.998	0.998	0.998
	0.18	0.98	0.983	0.986	0.988	0.99	0.992	0.993	0.994	0.994	0.995	0.996	0.996	0.997	0.997	0.997	0.998	0.998	0.998	0.998	0.998
	0.19	0.982	0.984	0.987	0.989	0.991	0.992	0.993	0.994	0.995	0.995	0.996	0.996	0.997	0.997	0.997	0.998	0.998	0.998	0.998	0.999
	0.2	0.983	0.986	0.988	0.99	0.992	0.993	0.994	0.995	0.995	0.995	0.996	0.997	0.997	0.997	0.998	0.998	0.998	0.998	0.998	0.999

Table E.97 Power Study: Sequential Test, n = 5 - H_0 : Gamma(3.5,1); H_a: Gamma(1,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.034	0.055	0.075	0.091	0.108	0.122	0.138	0.153	0.166	0.178	0.192	0.204	0.216	0.229	0.241	0.252	0.264	0.276	0.287	0.298
0.02	0.052	0.06	0.077	0.094	0.111	0.125	0.14	0.155	0.168	0.18	0.194	0.206	0.218	0.23	0.241	0.253	0.264	0.276	0.287	0.298
0.03	0.07	0.077	0.085	0.096	0.113	0.127	0.142	0.157	0.17	0.182	0.196	0.208	0.22	0.232	0.243	0.255	0.266	0.278	0.289	0.299
0.04	0.085	0.092	0.099	0.106	0.116	0.129	0.144	0.159	0.172	0.184	0.198	0.21	0.222	0.234	0.246	0.257	0.268	0.28	0.291	0.301
0.05	0.097	0.105	0.112	0.118	0.125	0.133	0.147	0.161	0.174	0.187	0.2	0.212	0.224	0.236	0.248	0.259	0.271	0.282	0.293	0.303
0.06	0.11	0.117	0.125	0.131	0.137	0.143	0.152	0.164	0.176	0.189	0.202	0.214	0.226	0.238	0.25	0.261	0.273	0.284	0.295	0.305
0.07	0.121	0.129	0.136	0.142	0.148	0.154	0.161	0.17	0.18	0.191	0.204	0.216	0.228	0.24	0.252	0.263	0.275	0.286	0.297	0.307
0.08	0.134	0.141	0.148	0.155	0.161	0.167	0.172	0.179	0.186	0.195	0.207	0.218	0.23	0.242	0.254	0.265	0.277	0.288	0.299	0.310
0.09	0.145	0.152	0.159	0.165	0.172	0.177	0.183	0.189	0.195	0.202	0.212	0.221	0.232	0.244	0.256	0.267	0.278	0.29	0.301	0.311
0.1	0.157	0.164	0.171	0.177	0.184	0.19	0.195	0.201	0.206	0.212	0.22	0.228	0.237	0.247	0.258	0.269	0.281	0.292	0.303	0.314
0.11	0.167	0.175	0.182	0.188	0.194	0.2	0.206	0.212	0.217	0.222	0.229	0.236	0.243	0.252	0.262	0.272	0.283	0.294	0.305	0.316
0.12	0.177	0.184	0.192	0.198	0.204	0.21	0.216	0.222	0.226	0.232	0.238	0.244	0.25	0.258	0.267	0.276	0.286	0.297	0.307	0.318
0.13	0.188	0.195	0.203	0.209	0.215	0.221	0.227	0.233	0.237	0.242	0.249	0.254	0.26	0.267	0.274	0.282	0.291	0.301	0.311	0.320
0.14	0.199	0.206	0.213	0.22	0.226	0.232	0.237	0.243	0.248	0.253	0.259	0.264	0.27	0.277	0.283	0.29	0.298	0.306	0.315	0.324
0.15	0.209	0.217	0.224	0.23	0.236	0.242	0.248	0.254	0.259	0.264	0.27	0.275	0.28	0.286	0.292	0.299	0.305	0.313	0.321	0.329
0.16	0.219	0.226	0.233	0.24	0.246	0.252	0.257	0.263	0.268	0.273	0.279	0.284	0.289	0.295	0.301	0.307	0.314	0.32	0.327	0.335
0.17	0.228	0.235	0.243	0.249	0.255	0.261	0.267	0.273	0.277	0.282	0.289	0.293	0.298	0.304	0.31	0.315	0.322	0.328	0.335	0.342
0.18	0.238	0.245	0.253	0.259	0.265	0.271	0.276	0.282	0.287	0.292	0.298	0.303	0.308	0.314	0.319	0.325	0.331	0.337	0.343	0.350
0.19	0.248	0.255	0.263	0.269	0.275	0.281	0.286	0.292	0.297	0.302	0.308	0.313	0.318	0.324	0.329	0.334	0.34	0.346	0.352	0.358
0.2	0.258	0.265	0.272	0.278	0.284	0.29	0.296	0.302	0.307	0.312	0.318	0.323	0.328	0.334	0.339	0.344	0.35	0.355	0.361	0.367

Table E.98 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a: Gamma(1,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.05	0.068	0.088	0.107	0.123	0.141	0.156	0.171	0.186	0.199	0.212	0.226	0.239	0.252	0.266	0.279	0.291	0.304	0.315	0.326
0.02	0.071	0.077	0.09	0.108	0.124	0.141	0.157	0.172	0.186	0.199	0.212	0.226	0.239	0.252	0.267	0.279	0.291	0.304	0.315	0.326
0.03	0.093	0.098	0.104	0.114	0.126	0.142	0.157	0.172	0.186	0.199	0.212	0.226	0.24	0.253	0.267	0.279	0.291	0.304	0.315	0.326
0.04	0.113	0.118	0.123	0.127	0.135	0.146	0.16	0.174	0.187	0.2	0.213	0.227	0.24	0.253	0.267	0.279	0.291	0.304	0.316	0.326
0.05	0.132	0.137	0.141	0.145	0.15	0.157	0.167	0.179	0.191	0.203	0.215	0.228	0.241	0.254	0.268	0.28	0.292	0.305	0.316	0.327
0.06	0.15	0.155	0.159	0.163	0.167	0.172	0.179	0.187	0.197	0.208	0.219	0.231	0.244	0.256	0.269	0.281	0.292	0.305	0.316	0.327
0.07	0.165	0.17	0.175	0.178	0.182	0.186	0.191	0.198	0.206	0.214	0.224	0.235	0.247	0.258	0.271	0.283	0.294	0.306	0.317	0.327
0.08	0.182	0.187	0.192	0.195	0.199	0.202	0.207	0.212	0.218	0.225	0.233	0.242	0.253	0.263	0.275	0.286	0.296	0.308	0.318	0.328
0.09	0.198	0.203	0.207	0.211	0.215	0.218	0.222	0.226	0.231	0.236	0.243	0.251	0.26	0.269	0.279	0.289	0.299	0.31	0.32	0.330
0.1	0.212	0.217	0.222	0.225	0.229	0.232	0.236	0.24	0.244	0.249	0.254	0.26	0.268	0.276	0.285	0.294	0.304	0.314	0.323	0.332
0.11	0.227	0.232	0.236	0.24	0.243	0.247	0.251	0.254	0.258	0.262	0.266	0.272	0.278	0.285	0.293	0.301	0.309	0.319	0.327	0.336
0.12	0.242	0.247	0.251	0.254	0.258	0.261	0.265	0.268	0.272	0.275	0.279	0.284	0.289	0.295	0.302	0.309	0.317	0.325	0.333	0.341
0.13	0.256	0.261	0.265	0.268	0.272	0.275	0.279	0.282	0.286	0.289	0.292	0.296	0.301	0.306	0.312	0.318	0.325	0.333	0.34	0.347
0.14	0.268	0.273	0.277	0.28	0.284	0.287	0.291	0.294	0.298	0.301	0.304	0.308	0.312	0.317	0.322	0.327	0.333	0.34	0.346	0.353
0.15	0.281	0.286	0.29	0.294	0.297	0.301	0.304	0.307	0.311	0.314	0.317	0.32	0.324	0.328	0.333	0.337	0.343	0.349	0.355	0.361
0.16	0.295	0.3	0.304	0.307	0.31	0.314	0.317	0.321	0.324	0.327	0.33	0.333	0.337	0.34	0.344	0.348	0.353	0.359	0.364	0.370
0.17	0.307	0.312	0.316	0.319	0.323	0.326	0.33	0.333	0.336	0.339	0.342	0.345	0.349	0.352	0.356	0.359	0.364	0.369	0.374	0.379
0.18	0.319	0.323	0.327	0.33	0.334	0.337	0.341	0.344	0.347	0.35	0.353	0.356	0.359	0.363	0.366	0.369	0.373	0.378	0.382	0.386
0.19	0.33	0.335	0.339	0.342	0.345	0.348	0.352	0.355	0.358	0.361	0.364	0.367	0.37	0.374	0.377	0.38	0.383	0.388	0.391	0.395
0.2	0.341	0.346	0.349	0.353	0.356	0.359	0.362	0.366	0.369	0.372	0.374	0.378	0.381	0.384	0.387	0.39	0.393	0.397	0.401	0.404

Table E.99 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a: Gamma(1,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.06	0.076	0.097	0.119	0.137	0.155	0.173	0.189	0.205	0.22	0.234	0.246	0.259	0.273	0.286	0.298	0.31	0.321	0.331	0.343
0.02	0.093	0.096	0.105	0.122	0.138	0.156	0.173	0.189	0.205	0.22	0.234	0.246	0.259	0.273	0.286	0.298	0.31	0.321	0.331	0.343
0.03	0.122	0.125	0.128	0.136	0.146	0.16	0.175	0.19	0.205	0.22	0.234	0.246	0.259	0.273	0.286	0.298	0.31	0.321	0.331	0.343
0.04	0.148	0.15	0.153	0.156	0.162	0.171	0.182	0.194	0.208	0.221	0.234	0.247	0.259	0.273	0.286	0.299	0.31	0.321	0.331	0.343
0.05	0.172	0.175	0.177	0.179	0.182	0.187	0.195	0.204	0.214	0.225	0.237	0.248	0.26	0.274	0.286	0.299	0.31	0.321	0.331	0.343
0.06	0.194	0.196	0.199	0.201	0.203	0.206	0.211	0.217	0.225	0.234	0.243	0.253	0.263	0.276	0.287	0.299	0.31	0.321	0.331	0.343
0.07	0.214	0.216	0.218	0.221	0.223	0.225	0.228	0.233	0.239	0.246	0.253	0.261	0.269	0.28	0.29	0.302	0.312	0.322	0.332	0.343
0.08	0.233	0.235	0.238	0.24	0.242	0.244	0.247	0.25	0.254	0.259	0.265	0.271	0.279	0.287	0.296	0.306	0.315	0.325	0.334	0.345
0.09	0.251	0.253	0.256	0.258	0.26	0.262	0.264	0.267	0.27	0.274	0.279	0.283	0.289	0.296	0.304	0.312	0.32	0.329	0.337	0.348
0.1	0.268	0.27	0.272	0.274	0.276	0.279	0.281	0.283	0.286	0.289	0.292	0.296	0.301	0.307	0.314	0.321	0.328	0.336	0.343	0.352
0.11	0.284	0.286	0.288	0.29	0.292	0.295	0.297	0.299	0.301	0.304	0.307	0.31	0.314	0.319	0.324	0.331	0.336	0.343	0.349	0.358
0.12	0.299	0.301	0.303	0.305	0.307	0.31	0.312	0.313	0.316	0.318	0.321	0.323	0.327	0.331	0.336	0.341	0.346	0.352	0.358	0.365
0.13	0.314	0.316	0.318	0.32	0.322	0.324	0.326	0.328	0.33	0.333	0.335	0.337	0.34	0.344	0.348	0.352	0.357	0.362	0.367	0.373
0.14	0.328	0.33	0.332	0.335	0.336	0.339	0.341	0.342	0.344	0.346	0.349	0.351	0.353	0.356	0.36	0.364	0.368	0.372	0.376	0.382
0.15	0.344	0.346	0.348	0.35	0.352	0.355	0.356	0.358	0.36	0.362	0.364	0.366	0.368	0.371	0.374	0.378	0.381	0.385	0.388	0.393
0.16	0.358	0.361	0.363	0.365	0.367	0.369	0.371	0.372	0.374	0.376	0.378	0.38	0.382	0.385	0.387	0.391	0.393	0.396	0.4	0.404
0.17	0.371	0.374	0.376	0.378	0.379	0.382	0.384	0.385	0.387	0.389	0.391	0.393	0.395	0.397	0.399	0.403	0.405	0.408	0.411	0.414
0.18	0.385	0.387	0.389	0.391	0.393	0.395	0.397	0.399	0.4	0.402	0.404	0.406	0.408	0.41	0.412	0.415	0.417	0.42	0.422	0.426
0.19	0.397	0.399	0.401	0.403	0.405	0.407	0.409	0.411	0.412	0.414	0.416	0.418	0.419	0.422	0.424	0.426	0.428	0.431	0.433	0.436
0.2	0.409	0.411	0.413	0.415	0.417	0.419	0.421	0.423	0.425	0.426	0.428	0.43	0.431	0.433	0.436	0.438	0.44	0.442	0.444	0.447

Table E.100 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a: Gamma(1,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.09	0.1	0.121	0.144	0.165	0.186	0.206	0.225	0.242	0.259	0.274	0.29	0.305	0.318	0.331	0.347	0.36	0.373	0.386	0.398
0.02	0.141	0.142	0.146	0.156	0.17	0.188	0.207	0.225	0.242	0.259	0.274	0.29	0.305	0.318	0.331	0.347	0.36	0.373	0.386	0.398
0.03	0.182	0.183	0.184	0.186	0.192	0.203	0.215	0.229	0.244	0.259	0.274	0.29	0.305	0.318	0.331	0.347	0.36	0.373	0.386	0.398
0.04	0.216	0.216	0.217	0.218	0.22	0.226	0.233	0.241	0.253	0.265	0.277	0.292	0.306	0.319	0.331	0.347	0.36	0.373	0.386	0.398
0.05	0.249	0.249	0.25	0.25	0.252	0.254	0.258	0.263	0.269	0.278	0.287	0.299	0.31	0.322	0.333	0.348	0.361	0.374	0.386	0.398
0.06	0.279	0.279	0.28	0.28	0.281	0.282	0.284	0.287	0.291	0.297	0.303	0.311	0.32	0.33	0.339	0.352	0.364	0.375	0.387	0.398
0.07	0.309	0.309	0.31	0.31	0.311	0.312	0.313	0.315	0.317	0.321	0.325	0.33	0.336	0.343	0.351	0.361	0.37	0.38	0.391	0.401
0.08	0.332	0.333	0.333	0.334	0.335	0.335	0.336	0.337	0.339	0.342	0.345	0.348	0.353	0.358	0.364	0.372	0.38	0.388	0.397	0.406
0.09	0.355	0.355	0.356	0.356	0.357	0.358	0.358	0.359	0.361	0.362	0.365	0.367	0.371	0.375	0.379	0.385	0.391	0.398	0.406	0.413
0.1	0.377	0.378	0.378	0.379	0.379	0.38	0.381	0.381	0.382	0.384	0.385	0.387	0.39	0.393	0.396	0.401	0.405	0.411	0.417	0.423
0.11	0.398	0.398	0.399	0.399	0.4	0.4	0.401	0.402	0.403	0.404	0.405	0.407	0.409	0.411	0.414	0.417	0.421	0.425	0.43	0.434
0.12	0.417	0.417	0.418	0.418	0.419	0.419	0.42	0.421	0.422	0.423	0.424	0.425	0.426	0.428	0.431	0.433	0.436	0.44	0.443	0.447
0.13	0.435	0.436	0.436	0.437	0.437	0.438	0.439	0.439	0.44	0.441	0.442	0.443	0.444	0.446	0.448	0.45	0.452	0.455	0.458	0.461
0.14	0.453	0.454	0.454	0.455	0.455	0.456	0.457	0.457	0.458	0.459	0.46	0.461	0.462	0.463	0.464	0.466	0.468	0.47	0.473	0.475
0.15	0.471	0.471	0.472	0.472	0.473	0.474	0.474	0.475	0.476	0.476	0.477	0.478	0.479	0.481	0.482	0.483	0.485	0.486	0.488	0.490
0.16	0.486	0.487	0.487	0.488	0.488	0.489	0.49	0.49	0.491	0.492	0.493	0.493	0.494	0.495	0.496	0.498	0.499	0.501	0.502	0.504
0.17	0.502	0.502	0.503	0.503	0.504	0.505	0.505	0.506	0.507	0.507	0.508	0.509	0.51	0.511	0.512	0.513	0.514	0.515	0.517	0.518
0.18	0.517	0.517	0.518	0.518	0.519	0.52	0.52	0.521	0.522	0.522	0.523	0.524	0.525	0.526	0.527	0.528	0.529	0.53	0.531	0.532
0.19	0.533	0.533	0.533	0.534	0.534	0.535	0.536	0.536	0.537	0.538	0.539	0.539	0.54	0.541	0.542	0.543	0.544	0.545	0.546	0.547
0.2	0.546	0.546	0.547	0.547	0.548	0.548	0.549	0.549	0.55	0.551	0.552	0.553	0.553	0.554	0.555	0.556	0.557	0.558	0.559	0.560

Table E.101 Power Study: Sequential Test, n = 5 - H_0 : Gamma(3.5,1); H_a: Gamma(2,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.018	0.03	0.044	0.055	0.067	0.079	0.089	0.101	0.11	0.121	0.132	0.144	0.155	0.166	0.177	0.188	0.198	0.207	0.218	0.230
0.02	0.03	0.036	0.048	0.06	0.071	0.083	0.093	0.105	0.114	0.125	0.135	0.146	0.157	0.168	0.178	0.189	0.198	0.208	0.219	0.230
0.03	0.043	0.048	0.055	0.064	0.075	0.087	0.098	0.109	0.118	0.129	0.139	0.15	0.161	0.172	0.182	0.192	0.201	0.211	0.222	0.232
0.04	0.053	0.059	0.065	0.071	0.079	0.09	0.101	0.112	0.122	0.132	0.143	0.154	0.165	0.175	0.186	0.196	0.205	0.214	0.225	0.235
0.05	0.063	0.069	0.076	0.081	0.087	0.095	0.105	0.116	0.126	0.136	0.147	0.158	0.168	0.179	0.189	0.199	0.209	0.218	0.228	0.239
0.06	0.074	0.08	0.086	0.092	0.097	0.103	0.11	0.12	0.13	0.14	0.151	0.162	0.172	0.183	0.193	0.203	0.213	0.222	0.232	0.243
0.07	0.083	0.089	0.096	0.101	0.106	0.112	0.117	0.126	0.134	0.143	0.154	0.165	0.176	0.186	0.197	0.207	0.216	0.225	0.236	0.246
0.08	0.095	0.1	0.107	0.112	0.117	0.123	0.128	0.135	0.141	0.149	0.158	0.169	0.18	0.191	0.201	0.211	0.22	0.229	0.24	0.250
0.09	0.104	0.109	0.116	0.121	0.127	0.132	0.137	0.143	0.148	0.155	0.163	0.173	0.183	0.194	0.204	0.214	0.223	0.233	0.243	0.253
0.1	0.115	0.12	0.127	0.132	0.137	0.143	0.148	0.154	0.158	0.164	0.171	0.18	0.188	0.198	0.208	0.218	0.227	0.237	0.247	0.257
0.11	0.125	0.13	0.137	0.142	0.147	0.153	0.158	0.164	0.168	0.174	0.18	0.187	0.195	0.204	0.213	0.222	0.231	0.241	0.251	0.261
0.12	0.134	0.14	0.146	0.152	0.157	0.163	0.168	0.173	0.177	0.183	0.189	0.195	0.202	0.21	0.218	0.227	0.235	0.244	0.255	0.265
0.13	0.145	0.15	0.157	0.162	0.167	0.173	0.178	0.184	0.188	0.193	0.199	0.205	0.211	0.218	0.225	0.233	0.241	0.249	0.259	0.269
0.14	0.154	0.16	0.166	0.172	0.177	0.183	0.188	0.194	0.198	0.203	0.209	0.214	0.22	0.226	0.233	0.24	0.247	0.255	0.264	0.274
0.15	0.164	0.17	0.177	0.182	0.187	0.193	0.198	0.204	0.208	0.213	0.219	0.224	0.23	0.235	0.241	0.248	0.255	0.261	0.27	0.279
0.16	0.174	0.18	0.186	0.192	0.197	0.203	0.207	0.213	0.217	0.223	0.228	0.234	0.239	0.244	0.25	0.257	0.263	0.269	0.277	0.285
0.17	0.185	0.19	0.197	0.202	0.207	0.213	0.218	0.224	0.228	0.233	0.239	0.245	0.249	0.255	0.26	0.266	0.272	0.277	0.285	0.292
0.18	0.194	0.199	0.206	0.212	0.217	0.222	0.227	0.233	0.237	0.242	0.248	0.254	0.258	0.263	0.269	0.274	0.28	0.285	0.292	0.299
0.19	0.204	0.209	0.216	0.222	0.227	0.232	0.237	0.243	0.247	0.252	0.258	0.264	0.268	0.273	0.278	0.284	0.289	0.294	0.301	0.308
0.2	0.214	0.22	0.226	0.232	0.237	0.242	0.247	0.253	0.257	0.263	0.268	0.274	0.279	0.284	0.289	0.294	0.299	0.304	0.311	0.317

Table E.102 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a: Gamma(2,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.022	0.035	0.049	0.063	0.075	0.088	0.1	0.113	0.124	0.135	0.146	0.158	0.169	0.179	0.191	0.202	0.213	0.223	0.234	0.246
0.02	0.033	0.039	0.051	0.064	0.077	0.089	0.102	0.114	0.126	0.137	0.148	0.159	0.17	0.181	0.192	0.203	0.214	0.225	0.236	0.247
0.03	0.044	0.049	0.056	0.067	0.079	0.091	0.103	0.116	0.127	0.138	0.149	0.16	0.171	0.182	0.193	0.205	0.215	0.226	0.237	0.249
0.04	0.056	0.061	0.066	0.073	0.083	0.094	0.105	0.118	0.129	0.14	0.151	0.162	0.173	0.184	0.195	0.206	0.217	0.228	0.238	0.250
0.05	0.066	0.071	0.076	0.082	0.089	0.099	0.109	0.12	0.131	0.142	0.153	0.164	0.175	0.185	0.196	0.208	0.218	0.229	0.24	0.251
0.06	0.077	0.082	0.087	0.093	0.099	0.106	0.114	0.124	0.134	0.144	0.155	0.166	0.177	0.187	0.198	0.209	0.22	0.231	0.241	0.253
0.07	0.088	0.093	0.098	0.103	0.109	0.115	0.121	0.13	0.139	0.148	0.159	0.169	0.179	0.19	0.2	0.211	0.222	0.232	0.243	0.254
0.08	0.098	0.103	0.108	0.113	0.119	0.124	0.129	0.137	0.144	0.153	0.163	0.172	0.182	0.192	0.203	0.214	0.224	0.234	0.245	0.256
0.09	0.109	0.114	0.119	0.124	0.129	0.134	0.139	0.145	0.151	0.159	0.168	0.177	0.186	0.196	0.206	0.216	0.226	0.237	0.247	0.258
0.1	0.119	0.124	0.129	0.134	0.139	0.144	0.148	0.154	0.159	0.166	0.173	0.182	0.19	0.199	0.209	0.219	0.229	0.239	0.249	0.260
0.11	0.129	0.134	0.139	0.144	0.149	0.154	0.158	0.163	0.168	0.173	0.181	0.188	0.196	0.204	0.213	0.223	0.233	0.242	0.252	0.262
0.12	0.14	0.145	0.149	0.154	0.159	0.163	0.168	0.172	0.177	0.182	0.188	0.195	0.202	0.209	0.218	0.227	0.236	0.246	0.255	0.265
0.13	0.151	0.155	0.16	0.165	0.169	0.174	0.178	0.182	0.186	0.191	0.197	0.203	0.209	0.216	0.224	0.232	0.241	0.25	0.259	0.268
0.14	0.161	0.165	0.17	0.174	0.179	0.183	0.187	0.192	0.195	0.2	0.205	0.211	0.217	0.223	0.23	0.238	0.246	0.255	0.263	0.272
0.15	0.171	0.176	0.18	0.184	0.189	0.193	0.197	0.201	0.205	0.209	0.214	0.219	0.225	0.23	0.237	0.244	0.252	0.26	0.268	0.276
0.16	0.182	0.186	0.19	0.195	0.199	0.204	0.208	0.212	0.215	0.219	0.224	0.229	0.233	0.239	0.244	0.251	0.258	0.266	0.273	0.281
0.17	0.193	0.197	0.201	0.205	0.21	0.214	0.218	0.222	0.225	0.229	0.234	0.238	0.243	0.247	0.253	0.259	0.266	0.273	0.279	0.287
0.18	0.203	0.207	0.211	0.215	0.22	0.224	0.228	0.232	0.235	0.238	0.243	0.247	0.251	0.256	0.261	0.267	0.273	0.279	0.286	0.293
0.19	0.213	0.217	0.221	0.225	0.23	0.234	0.237	0.241	0.244	0.248	0.252	0.256	0.26	0.264	0.269	0.275	0.28	0.287	0.293	0.299
0.2	0.223	0.227	0.23	0.234	0.238	0.243	0.246	0.25	0.253	0.256	0.261	0.264	0.268	0.272	0.277	0.282	0.287	0.293	0.299	0.305

Table E.103 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a: Gamma(2,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.024	0.036	0.05	0.064	0.076	0.089	0.101	0.113	0.125	0.137	0.149	0.159	0.171	0.183	0.193	0.203	0.215	0.226	0.236	0.246
0.02	0.036	0.042	0.052	0.066	0.077	0.09	0.102	0.114	0.126	0.138	0.149	0.16	0.172	0.183	0.194	0.204	0.215	0.226	0.236	0.247
0.03	0.049	0.053	0.059	0.069	0.08	0.091	0.103	0.115	0.126	0.138	0.15	0.161	0.172	0.184	0.194	0.205	0.216	0.227	0.237	0.247
0.04	0.061	0.065	0.069	0.076	0.084	0.094	0.105	0.116	0.127	0.139	0.151	0.161	0.173	0.184	0.195	0.205	0.216	0.227	0.237	0.248
0.05	0.073	0.077	0.081	0.086	0.092	0.1	0.109	0.119	0.129	0.14	0.151	0.162	0.173	0.185	0.195	0.205	0.217	0.227	0.238	0.248
0.06	0.086	0.089	0.093	0.097	0.102	0.108	0.115	0.124	0.133	0.143	0.154	0.164	0.174	0.186	0.196	0.206	0.218	0.228	0.238	0.249
0.07	0.096	0.1	0.104	0.107	0.111	0.116	0.123	0.13	0.138	0.147	0.157	0.166	0.176	0.187	0.197	0.207	0.218	0.229	0.239	0.249
0.08	0.108	0.111	0.116	0.119	0.123	0.127	0.132	0.138	0.145	0.153	0.161	0.17	0.179	0.189	0.199	0.209	0.22	0.23	0.24	0.250
0.09	0.12	0.123	0.127	0.13	0.134	0.138	0.142	0.148	0.153	0.16	0.168	0.175	0.184	0.193	0.203	0.211	0.222	0.232	0.241	0.251
0.1	0.131	0.134	0.138	0.141	0.144	0.148	0.152	0.157	0.162	0.168	0.175	0.181	0.189	0.197	0.206	0.214	0.224	0.233	0.243	0.253
0.11	0.141	0.144	0.148	0.151	0.154	0.158	0.161	0.166	0.17	0.175	0.181	0.187	0.194	0.202	0.21	0.218	0.227	0.236	0.245	0.254
0.12	0.152	0.155	0.158	0.161	0.164	0.168	0.171	0.176	0.18	0.184	0.189	0.195	0.201	0.208	0.216	0.223	0.231	0.239	0.248	0.257
0.13	0.161	0.164	0.168	0.17	0.174	0.177	0.18	0.185	0.188	0.192	0.197	0.202	0.207	0.214	0.221	0.227	0.235	0.243	0.251	0.260
0.14	0.172	0.175	0.178	0.181	0.184	0.187	0.191	0.195	0.198	0.201	0.206	0.21	0.215	0.221	0.228	0.234	0.241	0.248	0.256	0.264
0.15	0.184	0.186	0.19	0.192	0.195	0.198	0.202	0.205	0.208	0.212	0.216	0.22	0.224	0.23	0.235	0.241	0.247	0.254	0.261	0.269
0.16	0.194	0.197	0.2	0.202	0.205	0.208	0.211	0.215	0.218	0.221	0.225	0.228	0.232	0.237	0.243	0.248	0.254	0.26	0.267	0.274
0.17	0.204	0.207	0.21	0.212	0.215	0.218	0.221	0.224	0.227	0.23	0.234	0.237	0.241	0.245	0.25	0.255	0.26	0.266	0.273	0.280
0.18	0.214	0.217	0.22	0.222	0.225	0.228	0.231	0.234	0.236	0.239	0.243	0.246	0.249	0.254	0.258	0.262	0.267	0.273	0.279	0.286
0.19	0.225	0.227	0.23	0.232	0.235	0.238	0.24	0.244	0.246	0.249	0.252	0.255	0.258	0.262	0.266	0.27	0.275	0.281	0.286	0.292
0.2	0.235	0.237	0.24	0.242	0.244	0.247	0.25	0.253	0.255	0.258	0.261	0.264	0.267	0.271	0.275	0.278	0.283	0.288	0.293	0.299

Table E.104 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a: Gamma(2,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.025	0.036	0.049	0.063	0.076	0.088	0.101	0.113	0.124	0.135	0.147	0.158	0.17	0.182	0.193	0.205	0.215	0.226	0.236	0.248
0.02	0.04	0.044	0.052	0.064	0.076	0.088	0.101	0.113	0.124	0.135	0.147	0.158	0.17	0.182	0.193	0.205	0.215	0.226	0.236	0.248
0.03	0.055	0.058	0.062	0.069	0.079	0.09	0.101	0.113	0.124	0.136	0.147	0.158	0.17	0.182	0.193	0.205	0.216	0.226	0.237	0.248
0.04	0.069	0.072	0.075	0.08	0.087	0.094	0.104	0.115	0.125	0.136	0.147	0.159	0.171	0.182	0.193	0.206	0.216	0.226	0.237	0.248
0.05	0.083	0.085	0.088	0.092	0.096	0.102	0.11	0.119	0.127	0.138	0.148	0.159	0.171	0.183	0.193	0.206	0.216	0.227	0.237	0.249
0.06	0.096	0.099	0.101	0.104	0.107	0.112	0.118	0.125	0.132	0.142	0.151	0.161	0.173	0.184	0.194	0.206	0.216	0.227	0.237	0.249
0.07	0.111	0.113	0.116	0.118	0.121	0.125	0.129	0.135	0.141	0.149	0.156	0.166	0.176	0.186	0.195	0.207	0.217	0.227	0.237	0.249
0.08	0.123	0.125	0.127	0.13	0.132	0.135	0.139	0.144	0.149	0.156	0.163	0.17	0.18	0.189	0.198	0.209	0.218	0.228	0.238	0.249
0.09	0.135	0.137	0.139	0.141	0.144	0.147	0.15	0.153	0.158	0.163	0.169	0.176	0.184	0.193	0.201	0.211	0.22	0.229	0.239	0.250
0.1	0.148	0.15	0.152	0.154	0.156	0.159	0.161	0.165	0.168	0.173	0.178	0.184	0.192	0.199	0.206	0.215	0.223	0.232	0.241	0.252
0.11	0.161	0.163	0.165	0.167	0.169	0.171	0.174	0.177	0.18	0.184	0.188	0.193	0.199	0.206	0.212	0.22	0.228	0.236	0.244	0.255
0.12	0.172	0.173	0.175	0.177	0.179	0.181	0.184	0.186	0.189	0.193	0.197	0.201	0.207	0.213	0.218	0.226	0.233	0.241	0.248	0.258
0.13	0.183	0.184	0.186	0.188	0.19	0.192	0.195	0.197	0.2	0.203	0.206	0.21	0.215	0.22	0.225	0.232	0.239	0.246	0.253	0.262
0.14	0.195	0.196	0.198	0.2	0.202	0.204	0.206	0.208	0.211	0.213	0.217	0.22	0.224	0.229	0.234	0.24	0.246	0.252	0.259	0.267
0.15	0.207	0.208	0.209	0.211	0.213	0.215	0.217	0.219	0.222	0.224	0.227	0.23	0.234	0.239	0.243	0.249	0.254	0.26	0.266	0.273
0.16	0.218	0.219	0.221	0.223	0.224	0.226	0.228	0.23	0.232	0.234	0.237	0.24	0.243	0.247	0.251	0.257	0.262	0.267	0.272	0.280
0.17	0.229	0.23	0.232	0.233	0.235	0.237	0.239	0.24	0.242	0.245	0.247	0.25	0.253	0.257	0.261	0.265	0.27	0.275	0.28	0.287
0.18	0.24	0.241	0.242	0.244	0.246	0.247	0.249	0.251	0.253	0.255	0.257	0.26	0.263	0.266	0.27	0.274	0.278	0.283	0.287	0.294
0.19	0.251	0.252	0.254	0.255	0.257	0.258	0.26	0.262	0.264	0.266	0.268	0.27	0.273	0.276	0.279	0.283	0.287	0.291	0.295	0.301
0.2	0.263	0.264	0.265	0.266	0.268	0.269	0.271	0.272	0.274	0.276	0.278	0.28	0.283	0.286	0.289	0.293	0.296	0.3	0.304	0.309

Table E.105 Power Study: Sequential Test, n = 5 - H_0 : Gamma(3.5,1); H_a: Gamma(3.5,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.015	0.024	0.034	0.044	0.054	0.063	0.073	0.082	0.092	0.101	0.111	0.121	0.13	0.141	0.15	0.16	0.17	0.18	0.19	0.200
0.02	0.025	0.03	0.039	0.049	0.059	0.069	0.078	0.087	0.097	0.106	0.115	0.124	0.133	0.143	0.152	0.161	0.171	0.181	0.19	0.200
0.03	0.035	0.04	0.045	0.054	0.064	0.073	0.083	0.092	0.102	0.111	0.12	0.129	0.138	0.147	0.156	0.166	0.175	0.184	0.193	0.202
0.04	0.045	0.05	0.055	0.061	0.069	0.078	0.088	0.097	0.106	0.116	0.124	0.134	0.142	0.152	0.161	0.17	0.179	0.189	0.198	0.207
0.05	0.055	0.06	0.065	0.071	0.076	0.084	0.093	0.102	0.111	0.12	0.129	0.139	0.147	0.157	0.166	0.175	0.184	0.193	0.203	0.211
0.06	0.066	0.07	0.076	0.081	0.086	0.092	0.099	0.107	0.117	0.126	0.135	0.144	0.153	0.162	0.171	0.181	0.19	0.199	0.208	0.217
0.07	0.075	0.08	0.085	0.091	0.096	0.101	0.107	0.113	0.122	0.13	0.139	0.149	0.157	0.167	0.176	0.185	0.194	0.203	0.212	0.221
0.08	0.085	0.09	0.095	0.101	0.106	0.111	0.116	0.122	0.129	0.137	0.145	0.154	0.163	0.172	0.181	0.191	0.2	0.209	0.218	0.227
0.09	0.095	0.1	0.105	0.111	0.116	0.121	0.126	0.131	0.137	0.144	0.151	0.159	0.168	0.178	0.187	0.196	0.205	0.214	0.223	0.232
0.1	0.105	0.11	0.115	0.12	0.126	0.131	0.136	0.141	0.146	0.152	0.158	0.166	0.174	0.183	0.192	0.201	0.21	0.219	0.228	0.237
0.11	0.115	0.12	0.125	0.131	0.136	0.141	0.146	0.152	0.157	0.162	0.168	0.174	0.181	0.189	0.198	0.206	0.215	0.224	0.234	0.242
0.12	0.126	0.13	0.135	0.141	0.146	0.151	0.157	0.162	0.167	0.172	0.177	0.182	0.189	0.197	0.204	0.212	0.221	0.23	0.238	0.247
0.13	0.135	0.139	0.145	0.15	0.156	0.161	0.166	0.171	0.176	0.181	0.186	0.191	0.197	0.204	0.211	0.218	0.227	0.235	0.243	0.252
0.14	0.145	0.149	0.154	0.16	0.165	0.171	0.176	0.181	0.186	0.191	0.195	0.201	0.206	0.213	0.219	0.226	0.233	0.241	0.249	0.257
0.15	0.155	0.159	0.165	0.17	0.175	0.181	0.186	0.191	0.196	0.201	0.205	0.211	0.216	0.222	0.227	0.234	0.241	0.248	0.256	0.264
0.16	0.165	0.169	0.174	0.18	0.185	0.19	0.195	0.201	0.206	0.211	0.215	0.22	0.225	0.231	0.237	0.243	0.25	0.256	0.263	0.271
0.17	0.174	0.179	0.184	0.19	0.195	0.2	0.205	0.21	0.215	0.22	0.225	0.23	0.235	0.241	0.246	0.252	0.258	0.264	0.271	0.277
0.18	0.183	0.188	0.193	0.199	0.204	0.209	0.214	0.219	0.224	0.229	0.234	0.239	0.244	0.25	0.255	0.26	0.266	0.272	0.278	0.285
0.19	0.193	0.198	0.203	0.209	0.214	0.219	0.224	0.23	0.235	0.24	0.244	0.249	0.254	0.26	0.265	0.27	0.276	0.281	0.287	0.294
0.2	0.203	0.208	0.213	0.219	0.224	0.229	0.234	0.239	0.244	0.249	0.254	0.259	0.264	0.269	0.274	0.28	0.285	0.29	0.296	0.302

Table E.106 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a: Gamma(3.5,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.017	0.027	0.038	0.048	0.057	0.067	0.078	0.088	0.098	0.107	0.117	0.127	0.137	0.147	0.157	0.167	0.176	0.186	0.196	0.206
0.02	0.027	0.033	0.043	0.052	0.062	0.072	0.083	0.092	0.103	0.112	0.121	0.131	0.142	0.152	0.162	0.172	0.181	0.191	0.2	0.210
0.03	0.036	0.042	0.049	0.058	0.067	0.077	0.087	0.097	0.107	0.117	0.126	0.136	0.146	0.156	0.167	0.176	0.185	0.195	0.205	0.214
0.04	0.047	0.052	0.058	0.064	0.073	0.082	0.092	0.102	0.112	0.121	0.131	0.14	0.15	0.161	0.171	0.18	0.189	0.199	0.209	0.218
0.05	0.056	0.061	0.067	0.072	0.079	0.088	0.097	0.107	0.117	0.126	0.135	0.145	0.155	0.165	0.175	0.184	0.193	0.203	0.213	0.222
0.06	0.066	0.072	0.077	0.082	0.088	0.095	0.103	0.112	0.122	0.131	0.14	0.149	0.159	0.169	0.179	0.189	0.197	0.207	0.217	0.226
0.07	0.076	0.081	0.086	0.091	0.096	0.102	0.11	0.118	0.127	0.135	0.144	0.154	0.163	0.173	0.183	0.192	0.201	0.21	0.22	0.230
0.08	0.086	0.091	0.096	0.101	0.106	0.112	0.118	0.125	0.133	0.141	0.15	0.159	0.168	0.178	0.187	0.197	0.205	0.214	0.224	0.233
0.09	0.096	0.101	0.106	0.111	0.116	0.121	0.126	0.133	0.14	0.147	0.155	0.164	0.173	0.182	0.192	0.201	0.209	0.218	0.228	0.237
0.1	0.106	0.111	0.116	0.12	0.125	0.13	0.135	0.141	0.147	0.154	0.162	0.169	0.178	0.187	0.196	0.205	0.213	0.222	0.232	0.241
0.11	0.116	0.121	0.126	0.13	0.135	0.139	0.144	0.149	0.155	0.161	0.168	0.175	0.183	0.192	0.201	0.209	0.218	0.226	0.236	0.245
0.12	0.126	0.131	0.135	0.14	0.144	0.149	0.153	0.158	0.163	0.168	0.175	0.182	0.189	0.197	0.206	0.214	0.222	0.231	0.24	0.249
0.13	0.136	0.141	0.145	0.149	0.154	0.158	0.163	0.167	0.172	0.177	0.183	0.189	0.196	0.203	0.212	0.22	0.227	0.235	0.244	0.253
0.14	0.146	0.151	0.155	0.159	0.164	0.168	0.172	0.177	0.181	0.186	0.191	0.197	0.203	0.21	0.218	0.226	0.233	0.241	0.249	0.258
0.15	0.156	0.161	0.165	0.169	0.173	0.178	0.182	0.186	0.19	0.194	0.199	0.205	0.211	0.217	0.225	0.232	0.239	0.246	0.254	0.263
0.16	0.166	0.171	0.175	0.179	0.183	0.187	0.191	0.195	0.199	0.203	0.207	0.213	0.218	0.224	0.231	0.239	0.245	0.252	0.26	0.268
0.17	0.177	0.181	0.185	0.188	0.193	0.197	0.201	0.205	0.209	0.212	0.216	0.221	0.227	0.232	0.239	0.246	0.252	0.258	0.266	0.273
0.18	0.186	0.19	0.194	0.197	0.201	0.205	0.209	0.213	0.217	0.22	0.224	0.229	0.234	0.239	0.246	0.252	0.258	0.264	0.271	0.278
0.19	0.195	0.199	0.203	0.206	0.21	0.214	0.218	0.222	0.225	0.229	0.233	0.237	0.242	0.247	0.253	0.259	0.265	0.271	0.277	0.284
0.2	0.205	0.208	0.212	0.215	0.219	0.223	0.226	0.23	0.234	0.237	0.241	0.245	0.25	0.255	0.26	0.266	0.271	0.277	0.283	0.290

Table E.107 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a: Gamma(3.5,1)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.016	0.025	0.035	0.045	0.054	0.065	0.075	0.086	0.095	0.104	0.115	0.125	0.135	0.145	0.155	0.165	0.175	0.185	0.195	0.205
	0.02	0.026	0.032	0.041	0.051	0.06	0.07	0.08	0.091	0.1	0.109	0.119	0.129	0.139	0.149	0.159	0.169	0.179	0.189	0.198	0.208
	0.03	0.036	0.041	0.047	0.056	0.064	0.074	0.084	0.094	0.104	0.112	0.123	0.132	0.143	0.153	0.162	0.172	0.182	0.192	0.201	0.211
	0.04	0.046	0.051	0.056	0.062	0.07	0.079	0.088	0.098	0.108	0.116	0.127	0.136	0.146	0.156	0.166	0.176	0.185	0.194	0.204	0.214
	0.05	0.056	0.061	0.065	0.07	0.076	0.084	0.093	0.103	0.111	0.12	0.13	0.139	0.149	0.159	0.169	0.178	0.188	0.197	0.207	0.216
	0.06	0.066	0.07	0.074	0.078	0.083	0.09	0.098	0.107	0.116	0.124	0.134	0.143	0.152	0.162	0.172	0.181	0.19	0.2	0.209	0.218
	0.07	0.076	0.08	0.083	0.087	0.092	0.098	0.105	0.113	0.121	0.129	0.138	0.147	0.156	0.166	0.175	0.184	0.193	0.203	0.212	0.221
	0.08	0.085	0.089	0.092	0.096	0.1	0.105	0.112	0.119	0.127	0.134	0.142	0.151	0.16	0.169	0.178	0.187	0.196	0.205	0.215	0.224
	0.09	0.095	0.099	0.102	0.105	0.109	0.114	0.119	0.126	0.133	0.14	0.148	0.156	0.164	0.173	0.182	0.191	0.199	0.208	0.217	0.227
	0.1	0.104	0.108	0.111	0.114	0.118	0.122	0.127	0.133	0.14	0.146	0.153	0.161	0.169	0.177	0.185	0.194	0.202	0.211	0.22	0.229
	0.11	0.116	0.119	0.122	0.125	0.128	0.132	0.137	0.142	0.148	0.153	0.16	0.167	0.174	0.182	0.19	0.198	0.206	0.215	0.224	0.233
	0.12	0.126	0.129	0.132	0.135	0.138	0.142	0.145	0.15	0.155	0.161	0.166	0.173	0.18	0.187	0.195	0.202	0.21	0.219	0.227	0.236
	0.13	0.134	0.138	0.14	0.143	0.146	0.15	0.153	0.158	0.163	0.168	0.173	0.179	0.185	0.192	0.2	0.207	0.214	0.222	0.23	0.239
	0.14	0.145	0.147	0.15	0.153	0.155	0.159	0.163	0.167	0.171	0.176	0.18	0.186	0.192	0.199	0.205	0.212	0.219	0.227	0.235	0.243
	0.15	0.155	0.158	0.16	0.163	0.166	0.169	0.172	0.176	0.181	0.185	0.189	0.194	0.199	0.205	0.212	0.218	0.225	0.232	0.24	0.247
	0.16	0.165	0.168	0.17	0.173	0.175	0.179	0.182	0.186	0.19	0.193	0.197	0.202	0.207	0.213	0.219	0.224	0.231	0.238	0.245	0.252
	0.17	0.175	0.178	0.18	0.182	0.184	0.188	0.191	0.194	0.198	0.201	0.205	0.21	0.214	0.22	0.225	0.231	0.237	0.243	0.25	0.257
	0.18	0.186	0.188	0.19	0.192	0.194	0.197	0.2	0.204	0.207	0.21	0.214	0.218	0.223	0.228	0.233	0.238	0.243	0.25	0.256	0.262
	0.19	0.196	0.198	0.2	0.202	0.204	0.207	0.21	0.213	0.216	0.22	0.223	0.227	0.231	0.236	0.24	0.245	0.25	0.256	0.262	0.268
	0.2	0.205	0.207	0.209	0.211	0.213	0.216	0.218	0.221	0.224	0.227	0.231	0.234	0.238	0.243	0.247	0.251	0.256	0.262	0.268	0.273

Table E.108 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a: Gamma(3.5,1)

		Kurtosis Test Significance Level (α)																			
		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
Skewness Test Significance Level (α)	0.01	0.015	0.024	0.032	0.042	0.052	0.062	0.073	0.083	0.092	0.102	0.112	0.122	0.133	0.142	0.152	0.163	0.172	0.182	0.191	0.202
	0.02	0.023	0.029	0.036	0.046	0.055	0.065	0.075	0.085	0.094	0.104	0.114	0.123	0.134	0.143	0.153	0.164	0.173	0.183	0.193	0.203
	0.03	0.033	0.037	0.042	0.05	0.059	0.068	0.078	0.088	0.097	0.106	0.116	0.125	0.136	0.145	0.155	0.165	0.174	0.184	0.194	0.204
	0.04	0.042	0.046	0.05	0.056	0.063	0.072	0.082	0.091	0.1	0.109	0.119	0.128	0.138	0.147	0.157	0.167	0.176	0.186	0.195	0.205
	0.05	0.052	0.055	0.058	0.064	0.069	0.077	0.086	0.094	0.103	0.112	0.121	0.13	0.14	0.149	0.159	0.169	0.178	0.187	0.197	0.207
	0.06	0.063	0.066	0.068	0.073	0.078	0.084	0.092	0.099	0.107	0.116	0.125	0.133	0.143	0.152	0.162	0.172	0.18	0.19	0.199	0.209
	0.07	0.073	0.075	0.078	0.081	0.085	0.091	0.098	0.105	0.112	0.12	0.128	0.136	0.146	0.154	0.164	0.174	0.182	0.191	0.201	0.211
	0.08	0.082	0.085	0.087	0.09	0.094	0.098	0.104	0.11	0.117	0.124	0.132	0.14	0.149	0.157	0.166	0.176	0.184	0.193	0.203	0.212
	0.09	0.091	0.094	0.095	0.098	0.102	0.106	0.111	0.116	0.123	0.129	0.137	0.143	0.152	0.16	0.169	0.178	0.186	0.195	0.204	0.214
	0.1	0.1	0.102	0.104	0.107	0.11	0.114	0.118	0.123	0.129	0.135	0.142	0.148	0.157	0.164	0.172	0.181	0.189	0.198	0.207	0.216
	0.11	0.11	0.112	0.113	0.116	0.119	0.122	0.126	0.131	0.136	0.141	0.147	0.153	0.161	0.168	0.176	0.185	0.192	0.201	0.209	0.218
	0.12	0.119	0.121	0.122	0.125	0.127	0.131	0.134	0.138	0.142	0.147	0.153	0.158	0.166	0.172	0.18	0.188	0.195	0.204	0.212	0.221
	0.13	0.129	0.131	0.132	0.134	0.137	0.14	0.143	0.146	0.15	0.155	0.16	0.165	0.172	0.178	0.185	0.193	0.2	0.207	0.215	0.224
	0.14	0.139	0.141	0.142	0.144	0.146	0.149	0.152	0.155	0.159	0.162	0.167	0.172	0.178	0.183	0.19	0.197	0.204	0.212	0.219	0.227
	0.15	0.15	0.151	0.152	0.154	0.156	0.158	0.161	0.163	0.167	0.17	0.175	0.179	0.185	0.19	0.196	0.203	0.209	0.216	0.223	0.231
	0.16	0.159	0.16	0.161	0.162	0.164	0.167	0.169	0.171	0.174	0.178	0.182	0.185	0.191	0.196	0.202	0.208	0.214	0.221	0.228	0.235
	0.17	0.168	0.169	0.17	0.172	0.174	0.176	0.178	0.18	0.183	0.186	0.19	0.193	0.198	0.202	0.208	0.214	0.22	0.226	0.232	0.240
	0.18	0.177	0.178	0.179	0.18	0.182	0.184	0.186	0.188	0.191	0.193	0.197	0.2	0.205	0.209	0.214	0.22	0.225	0.231	0.237	0.244
	0.19	0.187	0.188	0.189	0.191	0.192	0.194	0.196	0.198	0.2	0.203	0.206	0.209	0.213	0.217	0.222	0.227	0.232	0.237	0.243	0.249
	0.2	0.197	0.198	0.199	0.2	0.202	0.203	0.205	0.206	0.209	0.211	0.214	0.217	0.221	0.224	0.229	0.234	0.238	0.243	0.249	0.255
	0.19	0.897	0.897	0.897	0.897	0.897	0.898	0.898	0.898	0.898	0.898	0.898	0.899	0.899	0.899	0.9	0.9	0.9	0.9	0.901	0.902
	0.2	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.903	0.903	0.903	0.903	0.903	0.903	0.904	0.904	0.904	0.905	0.905	0.905	0.906

Table E.109 Power Study: Sequential Test, n = 5 - H_0 : Gamma(3.5,1); H_a : $\chi^2(1)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.085	0.122	0.151	0.177	0.199	0.219	0.237	0.255	0.27	0.286	0.301	0.317	0.33	0.344	0.356	0.369	0.381	0.391	0.402	0.413
0.02	0.12	0.129	0.152	0.177	0.199	0.22	0.238	0.256	0.27	0.286	0.302	0.317	0.331	0.344	0.357	0.369	0.381	0.391	0.402	0.413
0.03	0.146	0.156	0.164	0.179	0.2	0.221	0.239	0.257	0.271	0.287	0.303	0.318	0.332	0.345	0.357	0.37	0.382	0.392	0.403	0.413
0.04	0.169	0.178	0.186	0.194	0.204	0.222	0.24	0.258	0.273	0.288	0.304	0.319	0.333	0.346	0.359	0.371	0.383	0.393	0.404	0.414
0.05	0.186	0.196	0.203	0.211	0.218	0.227	0.241	0.259	0.273	0.289	0.305	0.32	0.334	0.347	0.36	0.372	0.384	0.394	0.405	0.415
0.06	0.203	0.212	0.22	0.228	0.234	0.24	0.249	0.261	0.274	0.29	0.306	0.321	0.335	0.348	0.361	0.373	0.385	0.395	0.406	0.416
0.07	0.217	0.226	0.234	0.242	0.248	0.254	0.261	0.269	0.278	0.291	0.307	0.322	0.336	0.349	0.361	0.374	0.386	0.396	0.406	0.417
0.08	0.233	0.242	0.25	0.258	0.264	0.27	0.276	0.283	0.289	0.298	0.309	0.323	0.337	0.35	0.362	0.375	0.387	0.397	0.407	0.418
0.09	0.245	0.255	0.262	0.27	0.276	0.282	0.288	0.295	0.3	0.306	0.316	0.327	0.338	0.351	0.364	0.376	0.388	0.398	0.409	0.419
0.1	0.259	0.268	0.276	0.284	0.29	0.296	0.302	0.308	0.313	0.318	0.326	0.335	0.344	0.354	0.365	0.377	0.389	0.399	0.41	0.420
0.11	0.273	0.282	0.289	0.297	0.304	0.309	0.315	0.322	0.326	0.332	0.338	0.345	0.352	0.361	0.37	0.379	0.39	0.4	0.411	0.421
0.12	0.284	0.294	0.301	0.309	0.315	0.321	0.327	0.333	0.338	0.343	0.35	0.356	0.362	0.368	0.376	0.384	0.393	0.402	0.411	0.422
0.13	0.295	0.304	0.312	0.32	0.326	0.332	0.338	0.344	0.349	0.354	0.36	0.366	0.371	0.377	0.383	0.39	0.398	0.406	0.414	0.424
0.14	0.307	0.316	0.324	0.332	0.338	0.344	0.35	0.356	0.361	0.366	0.372	0.378	0.383	0.388	0.393	0.399	0.406	0.413	0.42	0.429
0.15	0.318	0.327	0.335	0.343	0.349	0.355	0.36	0.367	0.371	0.376	0.383	0.388	0.393	0.398	0.403	0.408	0.414	0.42	0.426	0.434
0.16	0.326	0.336	0.343	0.351	0.357	0.363	0.369	0.375	0.38	0.385	0.391	0.397	0.402	0.407	0.411	0.416	0.422	0.427	0.433	0.440
0.17	0.337	0.346	0.354	0.362	0.368	0.374	0.38	0.386	0.391	0.396	0.402	0.407	0.412	0.417	0.421	0.426	0.431	0.436	0.441	0.447
0.18	0.347	0.356	0.364	0.372	0.378	0.384	0.389	0.396	0.4	0.405	0.412	0.417	0.422	0.427	0.431	0.436	0.441	0.445	0.45	0.456
0.19	0.356	0.366	0.373	0.381	0.387	0.393	0.399	0.405	0.41	0.415	0.421	0.427	0.431	0.436	0.441	0.445	0.45	0.454	0.459	0.464
0.2	0.365	0.375	0.382	0.39	0.396	0.402	0.408	0.414	0.419	0.424	0.43	0.436	0.44	0.445	0.45	0.454	0.459	0.463	0.467	0.473

Table E.110 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a : $\chi^2(1)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.126	0.144	0.172	0.198	0.219	0.238	0.256	0.273	0.289	0.305	0.32	0.334	0.35	0.364	0.379	0.392	0.406	0.42	0.433	0.445
0.02	0.171	0.173	0.182	0.201	0.22	0.238	0.256	0.273	0.289	0.305	0.32	0.334	0.35	0.364	0.379	0.392	0.406	0.42	0.433	0.445
0.03	0.208	0.21	0.213	0.219	0.23	0.243	0.259	0.275	0.29	0.305	0.32	0.334	0.35	0.364	0.379	0.392	0.406	0.42	0.433	0.445
0.04	0.242	0.244	0.246	0.249	0.253	0.26	0.27	0.282	0.296	0.309	0.323	0.336	0.35	0.364	0.379	0.392	0.406	0.42	0.433	0.445
0.05	0.272	0.275	0.277	0.279	0.281	0.284	0.289	0.297	0.307	0.317	0.329	0.34	0.354	0.366	0.38	0.393	0.406	0.42	0.433	0.445
0.06	0.3	0.303	0.305	0.307	0.309	0.311	0.314	0.318	0.325	0.332	0.341	0.35	0.362	0.372	0.385	0.396	0.407	0.42	0.433	0.445
0.07	0.325	0.327	0.329	0.331	0.333	0.335	0.337	0.34	0.344	0.349	0.355	0.362	0.371	0.38	0.391	0.401	0.412	0.423	0.434	0.446
0.08	0.348	0.351	0.353	0.355	0.357	0.358	0.36	0.363	0.365	0.368	0.372	0.378	0.385	0.392	0.401	0.41	0.419	0.429	0.438	0.448
0.09	0.37	0.373	0.375	0.377	0.379	0.381	0.382	0.384	0.386	0.389	0.392	0.395	0.4	0.406	0.413	0.42	0.428	0.437	0.445	0.454
0.1	0.39	0.392	0.394	0.396	0.398	0.4	0.401	0.403	0.405	0.407	0.409	0.412	0.416	0.42	0.426	0.432	0.438	0.446	0.453	0.460
0.11	0.409	0.411	0.413	0.415	0.417	0.419	0.421	0.423	0.424	0.426	0.428	0.43	0.433	0.436	0.44	0.445	0.451	0.457	0.463	0.469
0.12	0.427	0.429	0.431	0.433	0.435	0.437	0.438	0.44	0.442	0.444	0.445	0.447	0.449	0.452	0.455	0.459	0.464	0.468	0.473	0.479
0.13	0.445	0.447	0.449	0.451	0.453	0.455	0.456	0.458	0.46	0.461	0.463	0.465	0.466	0.468	0.471	0.474	0.478	0.482	0.486	0.491
0.14	0.462	0.464	0.466	0.468	0.47	0.472	0.473	0.475	0.477	0.478	0.48	0.481	0.483	0.484	0.487	0.489	0.492	0.496	0.499	0.503
0.15	0.479	0.481	0.483	0.485	0.487	0.489	0.49	0.492	0.494	0.495	0.497	0.498	0.5	0.501	0.503	0.505	0.507	0.51	0.513	0.516
0.16	0.494	0.496	0.498	0.5	0.502	0.504	0.506	0.507	0.509	0.511	0.512	0.513	0.515	0.516	0.518	0.52	0.522	0.524	0.527	0.529
0.17	0.509	0.512	0.514	0.516	0.518	0.519	0.521	0.523	0.524	0.526	0.527	0.529	0.53	0.531	0.533	0.534	0.536	0.538	0.54	0.543
0.18	0.523	0.525	0.527	0.529	0.531	0.533	0.534	0.536	0.538	0.539	0.541	0.542	0.543	0.545	0.546	0.548	0.549	0.551	0.553	0.555
0.19	0.536	0.538	0.541	0.543	0.544	0.546	0.548	0.55	0.551	0.553	0.554	0.555	0.557	0.558	0.559	0.561	0.563	0.564	0.566	0.568
0.2	0.549	0.551	0.553	0.555	0.557	0.559	0.56	0.562	0.564	0.565	0.567	0.568	0.569	0.57	0.572	0.573	0.575	0.576	0.578	0.579

Table E.111 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); $H_a : \chi^2(1)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.171	0.183	0.211	0.243	0.27	0.295	0.32	0.343	0.363	0.381	0.399	0.415	0.43	0.445	0.46	0.473	0.487	0.498	0.51	0.522
0.02	0.242	0.243	0.247	0.261	0.277	0.297	0.32	0.343	0.363	0.381	0.399	0.415	0.43	0.445	0.46	0.473	0.487	0.498	0.51	0.522
0.03	0.298	0.299	0.3	0.303	0.309	0.319	0.332	0.347	0.365	0.381	0.399	0.415	0.43	0.445	0.46	0.473	0.487	0.498	0.51	0.522
0.04	0.343	0.344	0.345	0.346	0.347	0.351	0.357	0.366	0.377	0.389	0.403	0.418	0.432	0.446	0.46	0.473	0.487	0.498	0.51	0.522
0.05	0.383	0.384	0.384	0.385	0.386	0.388	0.39	0.395	0.4	0.407	0.417	0.427	0.438	0.45	0.463	0.475	0.488	0.499	0.51	0.522
0.06	0.417	0.418	0.419	0.419	0.42	0.421	0.422	0.424	0.427	0.432	0.437	0.444	0.451	0.46	0.47	0.48	0.491	0.501	0.511	0.522
0.07	0.448	0.448	0.449	0.45	0.45	0.451	0.452	0.453	0.454	0.457	0.46	0.465	0.47	0.476	0.483	0.49	0.498	0.506	0.515	0.525
0.08	0.473	0.473	0.474	0.475	0.476	0.476	0.477	0.478	0.479	0.48	0.483	0.486	0.489	0.493	0.498	0.503	0.509	0.515	0.523	0.531
0.09	0.497	0.497	0.498	0.499	0.5	0.5	0.501	0.502	0.502	0.504	0.505	0.507	0.509	0.513	0.516	0.519	0.524	0.528	0.534	0.541
0.1	0.519	0.52	0.52	0.521	0.522	0.523	0.523	0.524	0.525	0.526	0.527	0.528	0.529	0.532	0.534	0.537	0.54	0.543	0.547	0.552
0.11	0.54	0.541	0.542	0.543	0.543	0.544	0.544	0.545	0.546	0.547	0.548	0.549	0.549	0.551	0.553	0.555	0.557	0.56	0.563	0.567
0.12	0.559	0.56	0.561	0.562	0.562	0.563	0.563	0.564	0.565	0.566	0.566	0.567	0.568	0.569	0.571	0.572	0.574	0.576	0.578	0.581
0.13	0.578	0.578	0.579	0.58	0.58	0.581	0.582	0.582	0.583	0.584	0.584	0.585	0.586	0.587	0.588	0.589	0.59	0.592	0.594	0.596
0.14	0.594	0.595	0.596	0.596	0.597	0.598	0.598	0.599	0.6	0.6	0.601	0.602	0.602	0.603	0.604	0.605	0.606	0.607	0.609	0.610
0.15	0.613	0.613	0.614	0.615	0.615	0.616	0.617	0.617	0.618	0.619	0.619	0.62	0.62	0.621	0.622	0.623	0.624	0.625	0.626	0.627
0.16	0.627	0.628	0.628	0.629	0.63	0.63	0.631	0.632	0.632	0.633	0.634	0.634	0.635	0.635	0.636	0.637	0.638	0.639	0.639	0.641
0.17	0.641	0.641	0.642	0.643	0.643	0.644	0.645	0.645	0.646	0.647	0.647	0.648	0.648	0.649	0.65	0.65	0.651	0.652	0.653	0.654
0.18	0.655	0.656	0.657	0.657	0.658	0.659	0.659	0.66	0.661	0.661	0.662	0.663	0.663	0.664	0.665	0.665	0.666	0.667	0.667	0.668
0.19	0.668	0.669	0.669	0.67	0.671	0.672	0.672	0.673	0.673	0.674	0.675	0.675	0.676	0.677	0.677	0.678	0.678	0.679	0.68	0.681
0.2	0.68	0.68	0.681	0.682	0.682	0.683	0.684	0.684	0.685	0.686	0.686	0.687	0.687	0.688	0.689	0.689	0.69	0.691	0.691	0.692

Table E.112 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); $H_a : \chi^2(1)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α): 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.284	0.288	0.305	0.335	0.37	0.403	0.432	0.459	0.483	0.505	0.524	0.543	0.562	0.579	0.594	0.61	0.624	0.637	0.649	0.661
0.02	0.395	0.396	0.396	0.4	0.409	0.423	0.441	0.463	0.484	0.505	0.525	0.543	0.562	0.579	0.594	0.61	0.624	0.637	0.649	0.661
0.03	0.472	0.472	0.472	0.473	0.474	0.478	0.484	0.492	0.503	0.516	0.531	0.547	0.563	0.579	0.594	0.61	0.624	0.638	0.649	0.661
0.04	0.527	0.527	0.527	0.527	0.527	0.528	0.53	0.533	0.537	0.544	0.553	0.562	0.573	0.586	0.598	0.612	0.625	0.638	0.65	0.661
0.05	0.577	0.577	0.577	0.577	0.577	0.578	0.578	0.579	0.581	0.584	0.587	0.592	0.597	0.604	0.612	0.622	0.631	0.642	0.652	0.663
0.06	0.618	0.618	0.618	0.619	0.619	0.619	0.619	0.619	0.62	0.621	0.622	0.624	0.627	0.631	0.636	0.641	0.647	0.655	0.662	0.670
0.07	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.656	0.656	0.657	0.657	0.659	0.661	0.663	0.666	0.669	0.674	0.678	0.683
0.08	0.682	0.682	0.682	0.682	0.682	0.682	0.683	0.683	0.683	0.683	0.683	0.684	0.684	0.685	0.687	0.688	0.69	0.693	0.696	0.699
0.09	0.708	0.708	0.708	0.708	0.708	0.708	0.709	0.709	0.709	0.709	0.709	0.709	0.709	0.71	0.711	0.712	0.713	0.715	0.717	0.719
0.1	0.731	0.731	0.731	0.731	0.731	0.731	0.731	0.731	0.731	0.732	0.732	0.732	0.732	0.732	0.733	0.733	0.734	0.735	0.737	0.738
0.11	0.751	0.751	0.751	0.751	0.751	0.751	0.751	0.751	0.751	0.752	0.752	0.752	0.752	0.752	0.752	0.753	0.753	0.754	0.755	0.756
0.12	0.767	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.769	0.769	0.769	0.77	0.77	0.771
0.13	0.782	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.783	0.784	0.784	0.784	0.784	0.785	0.785
0.14	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.798	0.799	0.799	0.799	0.799	0.799	0.799	0.799	0.799	0.799	0.8	0.8	0.800
0.15	0.812	0.812	0.812	0.812	0.813	0.813	0.813	0.813	0.813	0.813	0.813	0.813	0.813	0.813	0.813	0.813	0.813	0.814	0.814	0.814
0.16	0.823	0.824	0.824	0.824	0.824	0.824	0.824	0.824	0.824	0.824	0.824	0.824	0.824	0.824	0.825	0.825	0.825	0.825	0.825	0.825
0.17	0.834	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.835	0.836	0.836	0.836	0.836	0.836	0.836
0.18	0.844	0.844	0.844	0.844	0.844	0.844	0.845	0.845	0.845	0.845	0.845	0.845	0.845	0.845	0.845	0.845	0.845	0.845	0.846	0.846
0.19	0.854	0.854	0.854	0.854	0.854	0.854	0.854	0.854	0.854	0.854	0.854	0.854	0.854	0.855	0.855	0.855	0.855	0.855	0.855	0.855
0.2	0.863	0.863	0.863	0.863	0.863	0.863	0.863	0.863	0.863	0.863	0.863	0.863	0.863	0.864	0.864	0.864	0.864	0.864	0.864	0.864

Table E.113 Power Study: Sequential Test, n = 5 - H_0 : Gamma(3.5,1); $H_a : \chi^2(4)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.018	0.03	0.044	0.055	0.067	0.079	0.089	0.101	0.11	0.121	0.132	0.144	0.155	0.166	0.177	0.188	0.198	0.207	0.218	0.230
0.02	0.03	0.036	0.048	0.06	0.071	0.083	0.093	0.105	0.114	0.125	0.135	0.146	0.157	0.168	0.178	0.189	0.198	0.208	0.219	0.230
0.03	0.043	0.048	0.055	0.064	0.075	0.087	0.098	0.109	0.118	0.129	0.139	0.15	0.161	0.172	0.182	0.192	0.201	0.211	0.222	0.232
0.04	0.053	0.059	0.065	0.071	0.079	0.09	0.101	0.112	0.122	0.132	0.143	0.154	0.165	0.175	0.186	0.196	0.205	0.214	0.225	0.235
0.05	0.063	0.069	0.076	0.081	0.087	0.095	0.105	0.116	0.126	0.136	0.147	0.158	0.168	0.179	0.189	0.199	0.209	0.218	0.228	0.239
0.06	0.074	0.08	0.086	0.092	0.097	0.103	0.11	0.12	0.13	0.14	0.151	0.162	0.172	0.183	0.193	0.203	0.213	0.222	0.232	0.243
0.07	0.083	0.089	0.096	0.101	0.106	0.112	0.117	0.126	0.134	0.143	0.154	0.165	0.176	0.186	0.197	0.207	0.216	0.225	0.236	0.246
0.08	0.095	0.1	0.107	0.112	0.117	0.123	0.128	0.135	0.141	0.149	0.158	0.169	0.18	0.191	0.201	0.211	0.22	0.229	0.24	0.250
0.09	0.104	0.109	0.116	0.121	0.127	0.132	0.137	0.143	0.148	0.155	0.163	0.173	0.183	0.194	0.204	0.214	0.223	0.233	0.243	0.253
0.1	0.115	0.12	0.127	0.132	0.137	0.143	0.148	0.154	0.158	0.164	0.171	0.18	0.188	0.198	0.208	0.218	0.227	0.237	0.247	0.257
0.11	0.125	0.13	0.137	0.142	0.147	0.153	0.158	0.164	0.168	0.174	0.18	0.187	0.195	0.204	0.213	0.222	0.231	0.241	0.251	0.261
0.12	0.134	0.14	0.146	0.152	0.157	0.163	0.168	0.173	0.177	0.183	0.189	0.195	0.202	0.21	0.218	0.227	0.235	0.244	0.255	0.265
0.13	0.145	0.15	0.157	0.162	0.167	0.173	0.178	0.184	0.188	0.193	0.199	0.205	0.211	0.218	0.225	0.233	0.241	0.249	0.259	0.269
0.14	0.154	0.16	0.166	0.172	0.177	0.183	0.188	0.194	0.198	0.203	0.209	0.214	0.22	0.226	0.233	0.24	0.247	0.255	0.264	0.274
0.15	0.164	0.17	0.177	0.182	0.187	0.193	0.198	0.204	0.208	0.213	0.219	0.224	0.23	0.235	0.241	0.248	0.255	0.261	0.27	0.279
0.16	0.174	0.18	0.186	0.192	0.197	0.203	0.207	0.213	0.217	0.223	0.228	0.234	0.239	0.244	0.25	0.257	0.263	0.269	0.277	0.285
0.17	0.185	0.19	0.197	0.202	0.207	0.213	0.218	0.224	0.228	0.233	0.239	0.245	0.249	0.255	0.26	0.266	0.272	0.277	0.285	0.292
0.18	0.194	0.199	0.206	0.212	0.217	0.222	0.227	0.233	0.237	0.242	0.248	0.254	0.258	0.263	0.269	0.274	0.28	0.285	0.292	0.299
0.19	0.204	0.209	0.216	0.222	0.227	0.232	0.237	0.243	0.247	0.252	0.258	0.264	0.268	0.273	0.278	0.284	0.289	0.294	0.301	0.308
0.2	0.214	0.22	0.226	0.232	0.237	0.242	0.247	0.253	0.257	0.263	0.268	0.274	0.279	0.284	0.289	0.294	0.299	0.304	0.311	0.317

Table E.114 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); $H_a : \chi^2(4)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.022	0.035	0.049	0.063	0.075	0.088	0.1	0.113	0.124	0.135	0.146	0.158	0.169	0.179	0.191	0.202	0.213	0.223	0.234	0.246
0.02	0.033	0.039	0.051	0.064	0.077	0.089	0.102	0.114	0.126	0.137	0.148	0.159	0.17	0.181	0.192	0.203	0.214	0.225	0.236	0.247
0.03	0.044	0.049	0.056	0.067	0.079	0.091	0.103	0.116	0.127	0.138	0.149	0.16	0.171	0.182	0.193	0.205	0.215	0.226	0.237	0.249
0.04	0.056	0.061	0.066	0.073	0.083	0.094	0.105	0.118	0.129	0.14	0.151	0.162	0.173	0.184	0.195	0.206	0.217	0.228	0.238	0.250
0.05	0.066	0.071	0.076	0.082	0.089	0.099	0.109	0.12	0.131	0.142	0.153	0.164	0.175	0.185	0.196	0.208	0.218	0.229	0.24	0.251
0.06	0.077	0.082	0.087	0.093	0.099	0.106	0.114	0.124	0.134	0.144	0.155	0.166	0.177	0.187	0.198	0.209	0.22	0.231	0.241	0.253
0.07	0.088	0.093	0.098	0.103	0.109	0.115	0.121	0.13	0.139	0.148	0.159	0.169	0.179	0.19	0.2	0.211	0.222	0.232	0.243	0.254
0.08	0.098	0.103	0.108	0.113	0.119	0.124	0.129	0.137	0.144	0.153	0.163	0.172	0.182	0.192	0.203	0.214	0.224	0.234	0.245	0.256
0.09	0.109	0.114	0.119	0.124	0.129	0.134	0.139	0.145	0.151	0.159	0.168	0.177	0.186	0.196	0.206	0.216	0.226	0.237	0.247	0.258
0.1	0.119	0.124	0.129	0.134	0.139	0.144	0.148	0.154	0.159	0.166	0.173	0.182	0.19	0.199	0.209	0.219	0.229	0.239	0.249	0.260
0.11	0.129	0.134	0.139	0.144	0.149	0.154	0.158	0.163	0.168	0.173	0.181	0.188	0.196	0.204	0.213	0.223	0.233	0.242	0.252	0.262
0.12	0.14	0.145	0.149	0.154	0.159	0.163	0.168	0.172	0.177	0.182	0.188	0.195	0.202	0.209	0.218	0.227	0.236	0.246	0.255	0.265
0.13	0.151	0.155	0.16	0.165	0.169	0.174	0.178	0.182	0.186	0.191	0.197	0.203	0.209	0.216	0.224	0.232	0.241	0.25	0.259	0.268
0.14	0.161	0.165	0.17	0.174	0.179	0.183	0.187	0.192	0.195	0.2	0.205	0.211	0.217	0.223	0.23	0.238	0.246	0.255	0.263	0.272
0.15	0.171	0.176	0.18	0.184	0.189	0.193	0.197	0.201	0.205	0.209	0.214	0.219	0.225	0.23	0.237	0.244	0.252	0.26	0.268	0.276
0.16	0.182	0.186	0.19	0.195	0.199	0.204	0.208	0.212	0.215	0.219	0.224	0.229	0.233	0.239	0.244	0.251	0.258	0.266	0.273	0.281
0.17	0.193	0.197	0.201	0.205	0.21	0.214	0.218	0.222	0.225	0.229	0.234	0.238	0.243	0.247	0.253	0.259	0.266	0.273	0.279	0.287
0.18	0.203	0.207	0.211	0.215	0.22	0.224	0.228	0.232	0.235	0.238	0.243	0.247	0.251	0.256	0.261	0.267	0.273	0.279	0.286	0.293
0.19	0.213	0.217	0.221	0.225	0.23	0.234	0.237	0.241	0.244	0.248	0.252	0.256	0.26	0.264	0.269	0.275	0.28	0.287	0.293	0.299
0.2	0.223	0.227	0.23	0.234	0.238	0.243	0.246	0.25	0.253	0.256	0.261	0.264	0.268	0.272	0.277	0.282	0.287	0.293	0.299	0.305

Table E.115 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a : $\chi^2(4)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.024	0.036	0.05	0.064	0.076	0.089	0.101	0.113	0.125	0.137	0.149	0.159	0.171	0.183	0.193	0.203	0.215	0.226	0.236	0.246
0.02	0.036	0.042	0.052	0.066	0.077	0.09	0.102	0.114	0.126	0.138	0.149	0.16	0.172	0.183	0.194	0.204	0.215	0.226	0.236	0.247
0.03	0.049	0.053	0.059	0.069	0.08	0.091	0.103	0.115	0.126	0.138	0.15	0.161	0.172	0.184	0.194	0.205	0.216	0.227	0.237	0.247
0.04	0.061	0.065	0.069	0.076	0.084	0.094	0.105	0.116	0.127	0.139	0.151	0.161	0.173	0.184	0.195	0.205	0.216	0.227	0.237	0.248
0.05	0.073	0.077	0.081	0.086	0.092	0.1	0.109	0.119	0.129	0.14	0.151	0.162	0.173	0.185	0.195	0.205	0.217	0.227	0.238	0.248
0.06	0.086	0.089	0.093	0.097	0.102	0.108	0.115	0.124	0.133	0.143	0.154	0.164	0.174	0.186	0.196	0.206	0.218	0.228	0.238	0.249
0.07	0.096	0.1	0.104	0.107	0.111	0.116	0.123	0.13	0.138	0.147	0.157	0.166	0.176	0.187	0.197	0.207	0.218	0.229	0.239	0.249
0.08	0.108	0.111	0.116	0.119	0.123	0.127	0.132	0.138	0.145	0.153	0.161	0.17	0.179	0.189	0.199	0.209	0.22	0.23	0.24	0.250
0.09	0.12	0.123	0.127	0.13	0.134	0.138	0.142	0.148	0.153	0.16	0.168	0.175	0.184	0.193	0.203	0.211	0.222	0.232	0.241	0.251
0.1	0.131	0.134	0.138	0.141	0.144	0.148	0.152	0.157	0.162	0.168	0.175	0.181	0.189	0.197	0.206	0.214	0.224	0.233	0.243	0.253
0.11	0.141	0.144	0.148	0.151	0.154	0.158	0.161	0.166	0.17	0.175	0.181	0.187	0.194	0.202	0.21	0.218	0.227	0.236	0.245	0.254
0.12	0.152	0.155	0.158	0.161	0.164	0.168	0.171	0.176	0.18	0.184	0.189	0.195	0.201	0.208	0.216	0.223	0.231	0.239	0.248	0.257
0.13	0.161	0.164	0.168	0.17	0.174	0.177	0.18	0.185	0.188	0.192	0.197	0.202	0.207	0.214	0.221	0.227	0.235	0.243	0.251	0.260
0.14	0.172	0.175	0.178	0.181	0.184	0.187	0.191	0.195	0.198	0.201	0.206	0.21	0.215	0.221	0.228	0.234	0.241	0.248	0.256	0.264
0.15	0.184	0.186	0.19	0.192	0.195	0.198	0.202	0.205	0.208	0.212	0.216	0.22	0.224	0.23	0.235	0.241	0.247	0.254	0.261	0.269
0.16	0.194	0.197	0.2	0.202	0.205	0.208	0.211	0.215	0.218	0.221	0.225	0.228	0.232	0.237	0.243	0.248	0.254	0.26	0.267	0.274
0.17	0.204	0.207	0.21	0.212	0.215	0.218	0.221	0.224	0.227	0.23	0.234	0.237	0.241	0.245	0.25	0.255	0.26	0.266	0.273	0.280
0.18	0.214	0.217	0.22	0.222	0.225	0.228	0.231	0.234	0.236	0.239	0.243	0.246	0.249	0.254	0.258	0.262	0.267	0.273	0.279	0.286
0.19	0.225	0.227	0.23	0.232	0.235	0.238	0.24	0.244	0.246	0.249	0.252	0.255	0.258	0.262	0.266	0.27	0.275	0.281	0.286	0.292
0.2	0.235	0.237	0.24	0.242	0.244	0.247	0.25	0.253	0.255	0.258	0.261	0.264	0.267	0.271	0.275	0.278	0.283	0.288	0.293	0.299

Table E.116 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a : $\chi^2(4)$

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.025	0.036	0.049	0.063	0.076	0.088	0.101	0.113	0.124	0.135	0.147	0.158	0.17	0.182	0.193	0.205	0.215	0.226	0.236	0.248
0.02	0.04	0.044	0.052	0.064	0.076	0.088	0.101	0.113	0.124	0.135	0.147	0.158	0.17	0.182	0.193	0.205	0.215	0.226	0.236	0.248
0.03	0.055	0.058	0.062	0.069	0.079	0.09	0.101	0.113	0.124	0.136	0.147	0.158	0.17	0.182	0.193	0.205	0.216	0.226	0.237	0.248
0.04	0.069	0.072	0.075	0.08	0.087	0.094	0.104	0.115	0.125	0.136	0.147	0.159	0.171	0.182	0.193	0.206	0.216	0.226	0.237	0.248
0.05	0.083	0.085	0.088	0.092	0.096	0.102	0.11	0.119	0.127	0.138	0.148	0.159	0.171	0.183	0.193	0.206	0.216	0.227	0.237	0.249
0.06	0.096	0.099	0.101	0.104	0.107	0.112	0.118	0.125	0.132	0.142	0.151	0.161	0.173	0.184	0.194	0.206	0.216	0.227	0.237	0.249
0.07	0.111	0.113	0.116	0.118	0.121	0.125	0.129	0.135	0.141	0.149	0.156	0.166	0.176	0.186	0.195	0.207	0.217	0.227	0.237	0.249
0.08	0.123	0.125	0.127	0.13	0.132	0.135	0.139	0.144	0.149	0.156	0.163	0.17	0.18	0.189	0.198	0.209	0.218	0.228	0.238	0.249
0.09	0.135	0.137	0.139	0.141	0.144	0.147	0.15	0.153	0.158	0.163	0.169	0.176	0.184	0.193	0.201	0.211	0.22	0.229	0.239	0.250
0.1	0.148	0.15	0.152	0.154	0.156	0.159	0.161	0.165	0.168	0.173	0.178	0.184	0.192	0.199	0.206	0.215	0.223	0.232	0.241	0.252
0.11	0.161	0.163	0.165	0.167	0.169	0.171	0.174	0.177	0.18	0.184	0.188	0.193	0.199	0.206	0.212	0.22	0.228	0.236	0.244	0.255
0.12	0.172	0.173	0.175	0.177	0.179	0.181	0.184	0.186	0.189	0.193	0.197	0.201	0.207	0.213	0.218	0.226	0.233	0.241	0.248	0.258
0.13	0.183	0.184	0.186	0.188	0.19	0.192	0.195	0.197	0.2	0.203	0.206	0.21	0.215	0.22	0.225	0.232	0.239	0.246	0.253	0.262
0.14	0.195	0.196	0.198	0.2	0.202	0.204	0.206	0.208	0.211	0.213	0.217	0.22	0.224	0.229	0.234	0.24	0.246	0.252	0.259	0.267
0.15	0.207	0.208	0.209	0.211	0.213	0.215	0.217	0.219	0.222	0.224	0.227	0.23	0.234	0.239	0.243	0.249	0.254	0.26	0.266	0.273
0.16	0.218	0.219	0.221	0.223	0.224	0.226	0.228	0.23	0.232	0.234	0.237	0.24	0.243	0.247	0.251	0.257	0.262	0.267	0.272	0.280
0.17	0.229	0.23	0.232	0.233	0.235	0.237	0.239	0.24	0.242	0.245	0.247	0.25	0.253	0.257	0.261	0.265	0.27	0.275	0.28	0.287
0.18	0.24	0.241	0.242	0.244	0.246	0.247	0.249	0.251	0.253	0.255	0.257	0.26	0.263	0.266	0.27	0.274	0.278	0.283	0.287	0.294
0.19	0.251	0.252	0.254	0.255	0.257	0.258	0.26	0.262	0.264	0.266	0.268	0.27	0.273	0.276	0.279	0.283	0.287	0.291	0.295	0.301
0.2	0.263	0.264	0.265	0.266	0.268	0.269	0.271	0.272	0.274	0.276	0.278	0.28	0.283	0.286	0.289	0.293	0.296	0.3	0.304	0.309

Table E.117 Power Study: Sequential Test, n = 5 - H_0 : Gamma(3.5,1); H_a: Lognorm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.058	0.088	0.115	0.136	0.157	0.175	0.192	0.207	0.221	0.236	0.251	0.265	0.278	0.291	0.304	0.316	0.328	0.339	0.35	0.362
0.02	0.088	0.095	0.116	0.137	0.158	0.176	0.193	0.209	0.223	0.238	0.252	0.266	0.279	0.292	0.304	0.316	0.328	0.34	0.351	0.362
0.03	0.112	0.119	0.126	0.139	0.159	0.177	0.195	0.21	0.224	0.239	0.254	0.267	0.28	0.293	0.305	0.318	0.329	0.341	0.352	0.363
0.04	0.132	0.138	0.145	0.151	0.162	0.179	0.196	0.212	0.226	0.241	0.255	0.269	0.281	0.295	0.307	0.319	0.331	0.342	0.353	0.365
0.05	0.148	0.155	0.161	0.167	0.173	0.183	0.198	0.213	0.227	0.242	0.257	0.271	0.283	0.297	0.309	0.321	0.332	0.344	0.355	0.366
0.06	0.164	0.17	0.177	0.183	0.188	0.195	0.204	0.215	0.229	0.244	0.258	0.272	0.285	0.298	0.31	0.322	0.334	0.345	0.356	0.368
0.07	0.178	0.185	0.191	0.197	0.203	0.208	0.215	0.222	0.233	0.245	0.26	0.274	0.286	0.3	0.312	0.324	0.336	0.347	0.358	0.369
0.08	0.194	0.201	0.208	0.213	0.219	0.224	0.23	0.235	0.242	0.251	0.263	0.276	0.288	0.302	0.314	0.326	0.338	0.349	0.36	0.371
0.09	0.208	0.214	0.221	0.227	0.232	0.238	0.243	0.248	0.253	0.26	0.269	0.279	0.29	0.303	0.315	0.327	0.339	0.35	0.361	0.373
0.1	0.221	0.228	0.235	0.24	0.246	0.251	0.257	0.262	0.266	0.272	0.278	0.286	0.295	0.306	0.317	0.329	0.341	0.352	0.363	0.375
0.11	0.234	0.241	0.248	0.253	0.259	0.264	0.27	0.275	0.279	0.284	0.289	0.296	0.302	0.311	0.321	0.332	0.343	0.354	0.365	0.377
0.12	0.246	0.252	0.259	0.265	0.27	0.276	0.281	0.286	0.29	0.295	0.3	0.306	0.311	0.319	0.327	0.337	0.346	0.356	0.367	0.378
0.13	0.258	0.265	0.272	0.277	0.283	0.288	0.294	0.298	0.303	0.308	0.312	0.317	0.322	0.328	0.335	0.343	0.352	0.361	0.37	0.381
0.14	0.27	0.277	0.283	0.289	0.295	0.3	0.306	0.31	0.315	0.32	0.324	0.329	0.333	0.339	0.345	0.352	0.359	0.367	0.376	0.385
0.15	0.282	0.288	0.295	0.301	0.307	0.312	0.318	0.322	0.327	0.332	0.336	0.341	0.345	0.35	0.355	0.362	0.368	0.374	0.382	0.390
0.16	0.293	0.3	0.306	0.312	0.318	0.323	0.329	0.333	0.338	0.343	0.347	0.352	0.355	0.36	0.365	0.371	0.377	0.382	0.389	0.397
0.17	0.303	0.31	0.317	0.322	0.328	0.333	0.339	0.344	0.348	0.353	0.357	0.362	0.365	0.37	0.375	0.381	0.386	0.391	0.397	0.403
0.18	0.313	0.32	0.326	0.332	0.338	0.343	0.349	0.353	0.358	0.363	0.367	0.372	0.375	0.38	0.385	0.39	0.395	0.4	0.405	0.411
0.19	0.323	0.33	0.337	0.342	0.348	0.353	0.359	0.364	0.368	0.373	0.377	0.382	0.386	0.39	0.395	0.399	0.404	0.409	0.415	0.420
0.2	0.332	0.339	0.346	0.351	0.357	0.362	0.368	0.373	0.377	0.382	0.386	0.391	0.395	0.399	0.404	0.408	0.413	0.418	0.423	0.428

Table E.118 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a: Lognorm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.172	0.195	0.222	0.247	0.268	0.288	0.305	0.322	0.339	0.354	0.369	0.382	0.398	0.411	0.425	0.439	0.451	0.464	0.476	0.489
0.02	0.217	0.22	0.23	0.25	0.269	0.288	0.305	0.322	0.339	0.354	0.369	0.382	0.398	0.411	0.425	0.439	0.451	0.464	0.476	0.489
0.03	0.253	0.255	0.258	0.265	0.278	0.293	0.308	0.324	0.34	0.354	0.369	0.382	0.398	0.411	0.426	0.439	0.451	0.465	0.476	0.489
0.04	0.285	0.287	0.289	0.292	0.297	0.307	0.318	0.331	0.345	0.358	0.372	0.384	0.398	0.411	0.426	0.439	0.451	0.465	0.476	0.489
0.05	0.311	0.313	0.316	0.318	0.32	0.326	0.333	0.343	0.354	0.365	0.377	0.388	0.402	0.414	0.426	0.439	0.452	0.465	0.477	0.489
0.06	0.338	0.34	0.342	0.344	0.346	0.349	0.353	0.359	0.366	0.375	0.386	0.396	0.408	0.418	0.43	0.441	0.452	0.465	0.477	0.489
0.07	0.36	0.362	0.364	0.366	0.368	0.37	0.372	0.376	0.381	0.388	0.397	0.405	0.416	0.425	0.435	0.446	0.455	0.467	0.477	0.489
0.08	0.38	0.382	0.384	0.386	0.388	0.39	0.392	0.394	0.398	0.403	0.41	0.416	0.425	0.433	0.442	0.451	0.46	0.47	0.48	0.490
0.09	0.4	0.402	0.404	0.406	0.408	0.41	0.411	0.413	0.416	0.419	0.424	0.429	0.436	0.442	0.45	0.458	0.466	0.476	0.484	0.494
0.1	0.417	0.419	0.421	0.423	0.424	0.426	0.428	0.43	0.432	0.434	0.438	0.442	0.447	0.452	0.459	0.466	0.473	0.482	0.49	0.498
0.11	0.433	0.435	0.437	0.439	0.441	0.443	0.444	0.446	0.447	0.45	0.453	0.456	0.461	0.465	0.47	0.476	0.482	0.49	0.496	0.504
0.12	0.449	0.45	0.452	0.454	0.456	0.458	0.46	0.461	0.463	0.465	0.468	0.47	0.474	0.477	0.481	0.487	0.492	0.498	0.504	0.511
0.13	0.464	0.466	0.468	0.47	0.472	0.474	0.475	0.477	0.478	0.48	0.482	0.485	0.488	0.49	0.494	0.498	0.502	0.508	0.513	0.518
0.14	0.478	0.48	0.482	0.484	0.485	0.487	0.489	0.49	0.492	0.494	0.496	0.498	0.501	0.503	0.506	0.51	0.513	0.517	0.522	0.527
0.15	0.492	0.494	0.496	0.497	0.499	0.501	0.502	0.504	0.505	0.507	0.509	0.511	0.513	0.515	0.518	0.521	0.524	0.528	0.532	0.536
0.16	0.505	0.507	0.509	0.511	0.512	0.514	0.516	0.517	0.518	0.52	0.522	0.524	0.526	0.527	0.53	0.533	0.535	0.539	0.542	0.546
0.17	0.518	0.52	0.522	0.524	0.525	0.527	0.529	0.53	0.531	0.533	0.535	0.536	0.538	0.54	0.542	0.544	0.546	0.55	0.553	0.556
0.18	0.529	0.531	0.533	0.535	0.536	0.538	0.54	0.541	0.543	0.544	0.546	0.548	0.55	0.551	0.553	0.555	0.557	0.56	0.562	0.565
0.19	0.54	0.542	0.544	0.546	0.547	0.549	0.551	0.552	0.553	0.555	0.557	0.558	0.56	0.561	0.563	0.565	0.567	0.57	0.572	0.575
0.2	0.551	0.553	0.555	0.557	0.558	0.56	0.562	0.563	0.564	0.566	0.568	0.569	0.571	0.572	0.574	0.576	0.577	0.58	0.582	0.584

Table E.119 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a: Lognorm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.262	0.276	0.304	0.337	0.364	0.388	0.411	0.431	0.451	0.468	0.484	0.498	0.512	0.525	0.538	0.551	0.564	0.575	0.586	0.597
0.02	0.329	0.33	0.336	0.351	0.37	0.389	0.411	0.431	0.451	0.468	0.484	0.498	0.512	0.525	0.538	0.551	0.564	0.575	0.586	0.597
0.03	0.382	0.382	0.383	0.387	0.395	0.406	0.42	0.435	0.452	0.468	0.484	0.498	0.512	0.525	0.538	0.551	0.564	0.575	0.586	0.597
0.04	0.421	0.422	0.422	0.424	0.427	0.432	0.441	0.449	0.462	0.474	0.487	0.499	0.512	0.526	0.538	0.551	0.564	0.575	0.586	0.597
0.05	0.457	0.458	0.458	0.459	0.461	0.463	0.467	0.472	0.48	0.487	0.497	0.506	0.517	0.528	0.54	0.552	0.564	0.575	0.586	0.597
0.06	0.486	0.487	0.487	0.488	0.489	0.49	0.492	0.495	0.5	0.505	0.512	0.518	0.526	0.535	0.545	0.555	0.567	0.577	0.587	0.597
0.07	0.512	0.513	0.513	0.514	0.514	0.515	0.516	0.518	0.521	0.524	0.528	0.533	0.539	0.545	0.553	0.562	0.571	0.58	0.589	0.599
0.08	0.535	0.536	0.536	0.537	0.537	0.538	0.539	0.54	0.542	0.544	0.547	0.55	0.554	0.559	0.565	0.571	0.579	0.586	0.594	0.602
0.09	0.554	0.555	0.555	0.556	0.557	0.557	0.558	0.559	0.56	0.562	0.564	0.566	0.569	0.573	0.577	0.582	0.588	0.594	0.601	0.608
0.1	0.573	0.573	0.574	0.574	0.575	0.575	0.576	0.577	0.578	0.579	0.58	0.582	0.585	0.587	0.59	0.594	0.599	0.604	0.609	0.615
0.11	0.589	0.59	0.59	0.591	0.591	0.592	0.593	0.593	0.594	0.595	0.596	0.597	0.599	0.601	0.604	0.607	0.61	0.614	0.619	0.623
0.12	0.604	0.605	0.605	0.606	0.607	0.607	0.608	0.608	0.609	0.61	0.611	0.612	0.613	0.615	0.617	0.619	0.622	0.625	0.628	0.632
0.13	0.617	0.618	0.618	0.619	0.619	0.62	0.621	0.621	0.622	0.623	0.624	0.624	0.626	0.627	0.629	0.63	0.633	0.635	0.638	0.641
0.14	0.63	0.631	0.631	0.632	0.633	0.633	0.634	0.634	0.635	0.636	0.636	0.637	0.638	0.639	0.641	0.642	0.644	0.646	0.648	0.651
0.15	0.645	0.645	0.646	0.646	0.647	0.647	0.648	0.649	0.65	0.65	0.651	0.651	0.652	0.653	0.654	0.656	0.657	0.659	0.661	0.663
0.16	0.657	0.657	0.658	0.658	0.659	0.659	0.66	0.661	0.662	0.662	0.663	0.663	0.664	0.665	0.666	0.667	0.668	0.67	0.671	0.673
0.17	0.667	0.667	0.668	0.668	0.669	0.669	0.67	0.671	0.671	0.672	0.673	0.673	0.674	0.675	0.676	0.676	0.678	0.679	0.68	0.682
0.18	0.679	0.679	0.68	0.68	0.681	0.681	0.682	0.683	0.684	0.684	0.685	0.685	0.686	0.687	0.687	0.688	0.689	0.69	0.691	0.693
0.19	0.689	0.69	0.69	0.691	0.691	0.692	0.692	0.693	0.694	0.694	0.695	0.695	0.696	0.697	0.698	0.698	0.699	0.7	0.701	0.702
0.2	0.699	0.699	0.7	0.7	0.701	0.701	0.702	0.702	0.703	0.704	0.704	0.705	0.706	0.706	0.707	0.707	0.708	0.709	0.71	0.711

Table E.120 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a: Lognorm(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α)																			
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.458	0.463	0.483	0.513	0.543	0.572	0.596	0.617	0.636	0.652	0.668	0.682	0.696	0.709	0.72	0.732	0.741	0.75	0.759	0.767
0.02	0.556	0.556	0.557	0.562	0.571	0.585	0.602	0.619	0.636	0.652	0.668	0.682	0.696	0.709	0.72	0.732	0.741	0.75	0.759	0.767
0.03	0.616	0.616	0.616	0.617	0.619	0.622	0.629	0.638	0.647	0.658	0.671	0.684	0.696	0.709	0.72	0.732	0.741	0.75	0.759	0.767
0.04	0.657	0.657	0.658	0.658	0.658	0.66	0.662	0.666	0.67	0.676	0.685	0.693	0.702	0.712	0.722	0.733	0.741	0.75	0.759	0.767
0.05	0.691	0.691	0.691	0.691	0.692	0.692	0.693	0.694	0.696	0.699	0.704	0.709	0.715	0.722	0.729	0.737	0.744	0.752	0.76	0.768
0.06	0.719	0.719	0.719	0.719	0.719	0.72	0.72	0.721	0.722	0.723	0.726	0.728	0.732	0.736	0.741	0.747	0.751	0.757	0.764	0.771
0.07	0.745	0.745	0.745	0.745	0.745	0.745	0.745	0.746	0.746	0.747	0.748	0.749	0.751	0.754	0.756	0.76	0.763	0.767	0.772	0.777
0.08	0.764	0.764	0.764	0.764	0.764	0.764	0.764	0.764	0.764	0.765	0.766	0.766	0.768	0.769	0.771	0.773	0.775	0.778	0.781	0.785
0.09	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.781	0.781	0.781	0.781	0.782	0.783	0.783	0.784	0.786	0.787	0.789	0.791	0.794
0.1	0.795	0.795	0.795	0.795	0.795	0.796	0.796	0.796	0.796	0.796	0.796	0.797	0.797	0.798	0.798	0.799	0.8	0.801	0.802	0.804
0.11	0.808	0.808	0.808	0.808	0.808	0.809	0.809	0.809	0.809	0.809	0.809	0.809	0.81	0.81	0.81	0.811	0.812	0.812	0.813	0.815
0.12	0.819	0.819	0.819	0.819	0.819	0.819	0.819	0.819	0.819	0.819	0.82	0.82	0.82	0.82	0.82	0.821	0.822	0.822	0.823	0.823
0.13	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.831	0.831	0.831	0.831	0.832	0.832	0.832	0.833
0.14	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.842	0.842	0.842	0.842	0.842	0.843	0.843	0.843	0.844
0.15	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.851	0.851	0.851	0.851	0.851	0.851	0.851	0.852	0.852	0.852	0.852	0.852
0.16	0.857	0.857	0.857	0.858	0.858	0.858	0.858	0.858	0.858	0.858	0.858	0.858	0.858	0.858	0.859	0.859	0.859	0.859	0.859	0.860
0.17	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.866	0.866	0.866	0.866	0.866	0.866	0.866	0.866	0.866	0.867	0.867	0.867
0.18	0.872	0.872	0.872	0.872	0.872	0.872	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.873	0.874	0.874	0.874	0.874
0.19	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.881	0.881	0.881	0.881	0.881	0.881	0.881
0.2	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.887	0.887	0.887	0.887	0.887	0.887	0.887	0.887

Table E.121 Power Study: Sequential Test, n = 5 - H_0 : Gamma(3.5,1); H_a: XLogistic(0,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.212	0.256	0.29	0.317	0.339	0.358	0.376	0.393	0.408	0.423	0.436	0.45	0.462	0.473	0.483	0.495	0.505	0.515	0.523	0.532
0.02	0.26	0.267	0.291	0.317	0.34	0.358	0.376	0.394	0.409	0.423	0.437	0.45	0.463	0.474	0.484	0.495	0.505	0.515	0.523	0.532
0.03	0.293	0.3	0.306	0.318	0.34	0.359	0.377	0.394	0.409	0.424	0.438	0.451	0.463	0.474	0.484	0.495	0.506	0.515	0.524	0.532
0.04	0.317	0.324	0.329	0.335	0.344	0.36	0.378	0.395	0.41	0.425	0.439	0.452	0.464	0.475	0.485	0.496	0.507	0.516	0.524	0.533
0.05	0.336	0.343	0.348	0.353	0.359	0.367	0.379	0.396	0.411	0.426	0.44	0.453	0.465	0.476	0.486	0.497	0.508	0.517	0.525	0.534
0.06	0.353	0.361	0.366	0.371	0.376	0.381	0.388	0.399	0.412	0.426	0.44	0.453	0.466	0.477	0.487	0.498	0.508	0.518	0.526	0.535
0.07	0.368	0.375	0.38	0.386	0.391	0.395	0.401	0.407	0.416	0.427	0.441	0.454	0.466	0.477	0.487	0.499	0.509	0.518	0.527	0.535
0.08	0.385	0.392	0.397	0.403	0.408	0.412	0.417	0.422	0.427	0.434	0.444	0.455	0.467	0.478	0.488	0.499	0.509	0.519	0.527	0.536
0.09	0.398	0.405	0.411	0.416	0.421	0.426	0.431	0.435	0.439	0.444	0.45	0.459	0.468	0.479	0.489	0.5	0.51	0.52	0.528	0.537
0.1	0.412	0.419	0.425	0.43	0.435	0.44	0.444	0.448	0.452	0.456	0.461	0.467	0.474	0.482	0.49	0.501	0.511	0.52	0.529	0.537
0.11	0.424	0.431	0.437	0.442	0.447	0.452	0.457	0.461	0.464	0.468	0.472	0.477	0.482	0.488	0.495	0.503	0.512	0.522	0.53	0.539
0.12	0.435	0.442	0.448	0.453	0.458	0.463	0.468	0.472	0.475	0.478	0.483	0.487	0.491	0.496	0.501	0.509	0.516	0.523	0.531	0.539
0.13	0.446	0.453	0.459	0.464	0.469	0.474	0.479	0.483	0.486	0.49	0.494	0.498	0.501	0.506	0.51	0.516	0.522	0.528	0.534	0.541
0.14	0.457	0.464	0.469	0.475	0.48	0.485	0.489	0.493	0.497	0.5	0.504	0.508	0.511	0.515	0.518	0.523	0.528	0.534	0.539	0.545
0.15	0.466	0.473	0.478	0.484	0.489	0.494	0.498	0.502	0.506	0.509	0.513	0.517	0.52	0.524	0.527	0.531	0.535	0.54	0.544	0.550
0.16	0.475	0.482	0.487	0.492	0.498	0.502	0.507	0.511	0.515	0.518	0.522	0.526	0.529	0.532	0.535	0.54	0.543	0.547	0.551	0.555
0.17	0.483	0.49	0.496	0.501	0.506	0.511	0.515	0.519	0.523	0.526	0.53	0.534	0.537	0.54	0.543	0.548	0.551	0.555	0.558	0.562
0.18	0.491	0.498	0.504	0.509	0.514	0.519	0.523	0.527	0.531	0.534	0.538	0.542	0.545	0.548	0.551	0.555	0.559	0.563	0.566	0.569
0.19	0.5	0.508	0.513	0.518	0.523	0.528	0.533	0.537	0.54	0.544	0.548	0.551	0.554	0.558	0.561	0.565	0.568	0.571	0.574	0.578
0.2	0.508	0.515	0.521	0.526	0.531	0.536	0.541	0.545	0.548	0.551	0.556	0.559	0.562	0.566	0.568	0.572	0.575	0.579	0.582	0.585

Table E.122 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a: XLogistic(0,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.489	0.5	0.522	0.548	0.567	0.586	0.604	0.619	0.635	0.649	0.663	0.677	0.693	0.705	0.717	0.727	0.736	0.744	0.753	0.761
0.02	0.547	0.547	0.551	0.562	0.575	0.589	0.605	0.62	0.635	0.649	0.663	0.677	0.693	0.705	0.717	0.727	0.736	0.744	0.753	0.761
0.03	0.597	0.597	0.598	0.6	0.604	0.612	0.623	0.633	0.645	0.655	0.666	0.677	0.693	0.705	0.717	0.727	0.736	0.744	0.753	0.761
0.04	0.636	0.636	0.637	0.638	0.639	0.642	0.647	0.654	0.661	0.668	0.677	0.685	0.696	0.705	0.717	0.727	0.736	0.744	0.753	0.761
0.05	0.663	0.664	0.665	0.665	0.666	0.667	0.669	0.673	0.677	0.682	0.688	0.695	0.703	0.71	0.719	0.727	0.736	0.744	0.753	0.761
0.06	0.688	0.688	0.689	0.689	0.69	0.69	0.692	0.693	0.696	0.699	0.703	0.707	0.713	0.719	0.725	0.731	0.738	0.745	0.753	0.761
0.07	0.709	0.709	0.71	0.71	0.711	0.711	0.712	0.713	0.714	0.716	0.719	0.722	0.726	0.73	0.734	0.739	0.744	0.749	0.755	0.762
0.08	0.726	0.727	0.727	0.728	0.728	0.729	0.729	0.73	0.731	0.732	0.733	0.735	0.738	0.741	0.744	0.748	0.752	0.756	0.761	0.766
0.09	0.742	0.743	0.744	0.744	0.744	0.745	0.745	0.746	0.747	0.747	0.748	0.75	0.751	0.753	0.756	0.758	0.761	0.764	0.768	0.772
0.1	0.756	0.756	0.757	0.758	0.758	0.758	0.759	0.759	0.76	0.761	0.761	0.762	0.763	0.765	0.766	0.768	0.77	0.772	0.775	0.778
0.11	0.767	0.768	0.768	0.769	0.769	0.769	0.77	0.771	0.771	0.771	0.772	0.773	0.774	0.775	0.776	0.777	0.779	0.781	0.783	0.785
0.12	0.778	0.779	0.78	0.78	0.78	0.781	0.781	0.782	0.782	0.783	0.783	0.784	0.784	0.785	0.786	0.787	0.788	0.79	0.791	0.793
0.13	0.79	0.79	0.791	0.791	0.791	0.792	0.793	0.793	0.793	0.794	0.794	0.794	0.795	0.796	0.796	0.797	0.798	0.799	0.8	0.802
0.14	0.798	0.799	0.799	0.8	0.8	0.801	0.801	0.802	0.802	0.802	0.803	0.803	0.804	0.804	0.805	0.806	0.806	0.807	0.808	0.809
0.15	0.807	0.807	0.808	0.809	0.809	0.809	0.81	0.81	0.811	0.811	0.811	0.812	0.812	0.813	0.813	0.814	0.815	0.815	0.816	0.817
0.16	0.816	0.816	0.817	0.818	0.818	0.818	0.819	0.819	0.82	0.82	0.82	0.821	0.821	0.822	0.822	0.823	0.823	0.824	0.824	0.825
0.17	0.824	0.825	0.825	0.826	0.826	0.826	0.827	0.828	0.828	0.828	0.829	0.829	0.829	0.83	0.83	0.831	0.831	0.832	0.832	0.833
0.18	0.831	0.832	0.832	0.833	0.833	0.833	0.834	0.834	0.835	0.835	0.836	0.836	0.836	0.837	0.837	0.838	0.838	0.838	0.839	0.839
0.19	0.838	0.839	0.839	0.84	0.84	0.841	0.841	0.842	0.842	0.842	0.843	0.843	0.843	0.844	0.844	0.845	0.845	0.845	0.846	0.846
0.2	0.844	0.844	0.845	0.845	0.846	0.846	0.847	0.847	0.848	0.848	0.848	0.849	0.849	0.85	0.85	0.85	0.851	0.851	0.851	0.852

Table E.123 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a: XLogistic(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.689	0.692	0.706	0.726	0.746	0.765	0.781	0.796	0.809	0.82	0.83	0.839	0.848	0.856	0.863	0.869	0.875	0.881	0.886	0.891
0.02	0.756	0.756	0.757	0.76	0.766	0.775	0.785	0.797	0.81	0.82	0.83	0.839	0.848	0.856	0.863	0.869	0.875	0.881	0.886	0.891
0.03	0.798	0.798	0.798	0.798	0.799	0.802	0.805	0.811	0.818	0.825	0.833	0.841	0.848	0.857	0.863	0.869	0.875	0.881	0.886	0.891
0.04	0.826	0.826	0.826	0.826	0.826	0.827	0.828	0.83	0.833	0.837	0.841	0.846	0.852	0.858	0.864	0.869	0.875	0.881	0.886	0.891
0.05	0.849	0.849	0.849	0.849	0.849	0.849	0.85	0.85	0.852	0.854	0.856	0.858	0.861	0.865	0.869	0.873	0.878	0.882	0.886	0.891
0.06	0.867	0.867	0.867	0.867	0.867	0.867	0.867	0.868	0.868	0.869	0.87	0.871	0.873	0.875	0.877	0.88	0.883	0.886	0.889	0.893
0.07	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.881	0.881	0.881	0.882	0.883	0.884	0.886	0.887	0.889	0.892	0.894	0.897
0.08	0.891	0.891	0.891	0.891	0.891	0.891	0.891	0.891	0.891	0.891	0.892	0.892	0.893	0.893	0.894	0.895	0.897	0.898	0.899	0.901
0.09	0.901	0.901	0.901	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.902	0.903	0.903	0.904	0.904	0.905	0.906	0.907	0.908
0.1	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.911	0.911	0.911	0.911	0.912	0.913	0.913	0.914
0.11	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.918	0.918	0.918	0.918	0.918	0.919	0.919	0.919	0.920
0.12	0.922	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.924	0.924	0.924	0.924	0.925
0.13	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.928	0.929	0.929	0.929	0.929	0.929	0.930
0.14	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.934	0.934	0.934	0.934	0.934
0.15	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.939	0.939	0.939	0.939	0.939	0.939
0.16	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.943	0.943	0.943	0.943	0.943
0.17	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.946	0.947
0.18	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.951
0.19	0.952	0.952	0.952	0.952	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953
0.2	0.955	0.955	0.955	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956

Table E.124 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a: XLogistic(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.924	0.924	0.925	0.928	0.934	0.941	0.948	0.954	0.959	0.962	0.966	0.969	0.971	0.974	0.975	0.977	0.979	0.98	0.981	0.982
0.02	0.954	0.954	0.954	0.954	0.954	0.955	0.957	0.959	0.961	0.963	0.966	0.969	0.971	0.974	0.975	0.977	0.979	0.98	0.981	0.982
0.03	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.969	0.969	0.97	0.971	0.972	0.973	0.975	0.976	0.978	0.979	0.98	0.981	0.982
0.04	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.976	0.976	0.976	0.977	0.978	0.979	0.98	0.981	0.982	0.983
0.05	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.981	0.981	0.981	0.982	0.982	0.982	0.983	0.984
0.06	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.985	0.985	0.985
0.07	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.987	0.987	0.987	0.987
0.08	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989
0.09	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.990
0.1	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
0.11	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993
0.12	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
0.13	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.995	0.995	0.995	0.995	0.995	0.995
0.14	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
0.15	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.996	0.996	0.996
0.16	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
0.17	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
0.18	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
0.19	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
0.2	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997

Table E.125 Power Study: Sequential Test, n = 5 - H_0 : Gamam(3.5,1); H_a: Xdouble-Exp.

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.163	0.2	0.23	0.252	0.273	0.29	0.307	0.322	0.335	0.349	0.363	0.376	0.389	0.4	0.41	0.421	0.431	0.442	0.452	0.461
0.02	0.204	0.211	0.232	0.255	0.275	0.292	0.309	0.324	0.337	0.351	0.364	0.377	0.39	0.401	0.411	0.421	0.431	0.442	0.453	0.462
0.03	0.234	0.24	0.244	0.257	0.277	0.294	0.311	0.326	0.339	0.353	0.366	0.379	0.391	0.403	0.412	0.423	0.433	0.443	0.454	0.462
0.04	0.256	0.262	0.266	0.27	0.281	0.296	0.312	0.328	0.34	0.355	0.368	0.381	0.393	0.404	0.414	0.425	0.435	0.445	0.455	0.464
0.05	0.274	0.28	0.284	0.289	0.293	0.301	0.314	0.329	0.342	0.356	0.37	0.383	0.395	0.406	0.416	0.426	0.436	0.447	0.457	0.466
0.06	0.29	0.296	0.3	0.305	0.309	0.314	0.321	0.332	0.344	0.358	0.371	0.384	0.396	0.408	0.417	0.428	0.438	0.448	0.459	0.467
0.07	0.305	0.311	0.315	0.319	0.324	0.328	0.333	0.339	0.348	0.359	0.373	0.386	0.398	0.409	0.419	0.429	0.439	0.45	0.46	0.469
0.08	0.321	0.327	0.331	0.335	0.34	0.344	0.348	0.353	0.358	0.366	0.376	0.388	0.4	0.411	0.421	0.431	0.441	0.452	0.462	0.471
0.09	0.335	0.341	0.345	0.349	0.353	0.357	0.361	0.365	0.369	0.375	0.382	0.392	0.402	0.413	0.422	0.433	0.443	0.453	0.464	0.472
0.1	0.348	0.354	0.358	0.363	0.367	0.371	0.375	0.379	0.382	0.386	0.392	0.399	0.407	0.416	0.424	0.435	0.445	0.455	0.465	0.474
0.11	0.36	0.366	0.37	0.375	0.379	0.383	0.387	0.391	0.394	0.398	0.402	0.407	0.414	0.421	0.428	0.437	0.446	0.457	0.467	0.476
0.12	0.371	0.377	0.381	0.385	0.389	0.394	0.397	0.401	0.404	0.408	0.412	0.417	0.422	0.427	0.434	0.442	0.45	0.459	0.469	0.477
0.13	0.383	0.389	0.393	0.397	0.402	0.406	0.41	0.413	0.416	0.42	0.424	0.428	0.433	0.438	0.442	0.449	0.456	0.464	0.472	0.480
0.14	0.394	0.4	0.404	0.408	0.413	0.417	0.421	0.424	0.428	0.431	0.435	0.439	0.443	0.447	0.451	0.456	0.463	0.469	0.477	0.484
0.15	0.404	0.41	0.414	0.418	0.423	0.427	0.431	0.434	0.437	0.441	0.445	0.449	0.452	0.456	0.46	0.465	0.47	0.476	0.483	0.489
0.16	0.413	0.419	0.424	0.428	0.432	0.436	0.44	0.444	0.447	0.451	0.455	0.458	0.462	0.465	0.469	0.473	0.478	0.483	0.489	0.494
0.17	0.423	0.429	0.433	0.438	0.442	0.446	0.45	0.454	0.457	0.46	0.464	0.468	0.471	0.475	0.478	0.482	0.486	0.491	0.496	0.501
0.18	0.432	0.438	0.442	0.446	0.45	0.455	0.459	0.462	0.465	0.469	0.473	0.476	0.48	0.483	0.487	0.49	0.494	0.499	0.503	0.508
0.19	0.441	0.447	0.451	0.455	0.459	0.464	0.467	0.471	0.474	0.478	0.482	0.485	0.489	0.492	0.495	0.499	0.503	0.507	0.511	0.515
0.2	0.45	0.456	0.46	0.464	0.468	0.472	0.476	0.48	0.483	0.487	0.491	0.494	0.498	0.501	0.504	0.508	0.511	0.515	0.519	0.523

Table E.126 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a: Xdouble-Exp.

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.453	0.469	0.492	0.517	0.536	0.555	0.571	0.587	0.601	0.615	0.629	0.642	0.656	0.669	0.681	0.691	0.7	0.708	0.717	0.725
0.02	0.506	0.508	0.514	0.528	0.542	0.558	0.572	0.587	0.601	0.615	0.629	0.642	0.656	0.669	0.681	0.691	0.7	0.709	0.717	0.726
0.03	0.551	0.552	0.554	0.558	0.566	0.575	0.586	0.598	0.609	0.62	0.632	0.643	0.657	0.669	0.681	0.691	0.7	0.709	0.717	0.726
0.04	0.588	0.589	0.59	0.591	0.594	0.6	0.606	0.614	0.623	0.631	0.64	0.649	0.659	0.67	0.681	0.691	0.7	0.709	0.717	0.726
0.05	0.615	0.616	0.617	0.618	0.619	0.622	0.625	0.631	0.637	0.643	0.65	0.657	0.666	0.675	0.683	0.691	0.7	0.709	0.717	0.726
0.06	0.637	0.637	0.638	0.639	0.64	0.641	0.644	0.647	0.652	0.656	0.661	0.667	0.674	0.681	0.688	0.695	0.702	0.709	0.717	0.726
0.07	0.656	0.656	0.657	0.658	0.658	0.659	0.661	0.663	0.666	0.669	0.673	0.678	0.683	0.689	0.695	0.7	0.706	0.712	0.719	0.727
0.08	0.673	0.674	0.675	0.675	0.676	0.677	0.677	0.679	0.681	0.683	0.686	0.689	0.694	0.698	0.703	0.707	0.712	0.717	0.723	0.729
0.09	0.688	0.688	0.689	0.69	0.69	0.691	0.692	0.693	0.694	0.696	0.698	0.7	0.704	0.707	0.711	0.715	0.719	0.724	0.728	0.734
0.1	0.699	0.7	0.7	0.701	0.702	0.702	0.703	0.704	0.705	0.706	0.708	0.71	0.713	0.716	0.719	0.722	0.725	0.729	0.734	0.738
0.11	0.711	0.712	0.713	0.713	0.714	0.715	0.715	0.716	0.717	0.718	0.719	0.721	0.723	0.725	0.728	0.73	0.733	0.736	0.74	0.744
0.12	0.723	0.724	0.725	0.725	0.726	0.726	0.727	0.728	0.729	0.73	0.731	0.732	0.734	0.735	0.738	0.74	0.742	0.745	0.748	0.751
0.13	0.735	0.736	0.737	0.737	0.738	0.738	0.739	0.74	0.741	0.741	0.742	0.743	0.745	0.746	0.748	0.749	0.751	0.754	0.756	0.759
0.14	0.745	0.745	0.746	0.746	0.747	0.748	0.748	0.749	0.75	0.75	0.751	0.752	0.753	0.754	0.756	0.757	0.759	0.761	0.763	0.766
0.15	0.753	0.753	0.754	0.755	0.755	0.756	0.756	0.757	0.758	0.758	0.759	0.76	0.761	0.762	0.763	0.764	0.766	0.768	0.77	0.772
0.16	0.762	0.762	0.763	0.763	0.764	0.765	0.765	0.766	0.767	0.767	0.767	0.768	0.769	0.77	0.771	0.772	0.773	0.775	0.776	0.778
0.17	0.77	0.77	0.771	0.771	0.772	0.772	0.773	0.774	0.774	0.775	0.775	0.776	0.777	0.778	0.779	0.78	0.781	0.782	0.783	0.785
0.18	0.777	0.778	0.779	0.779	0.78	0.78	0.781	0.782	0.782	0.783	0.783	0.784	0.785	0.785	0.786	0.787	0.788	0.789	0.79	0.791
0.19	0.784	0.785	0.786	0.786	0.787	0.787	0.788	0.789	0.789	0.79	0.79	0.791	0.791	0.792	0.793	0.793	0.794	0.795	0.796	0.797
0.2	0.791	0.792	0.792	0.793	0.793	0.794	0.794	0.795	0.796	0.796	0.796	0.797	0.798	0.798	0.799	0.8	0.801	0.801	0.802	0.803

Table E.127 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a: Xdouble-Exp.

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.657	0.663	0.678	0.7	0.721	0.739	0.755	0.769	0.783	0.794	0.803	0.812	0.821	0.829	0.836	0.843	0.85	0.856	0.861	0.866
0.02	0.72	0.72	0.722	0.728	0.736	0.745	0.758	0.77	0.784	0.794	0.803	0.812	0.821	0.829	0.836	0.843	0.85	0.856	0.861	0.866
0.03	0.76	0.76	0.761	0.762	0.765	0.769	0.774	0.78	0.79	0.798	0.805	0.813	0.821	0.829	0.836	0.843	0.85	0.856	0.861	0.866
0.04	0.789	0.789	0.789	0.789	0.79	0.792	0.794	0.797	0.802	0.807	0.811	0.817	0.824	0.83	0.836	0.843	0.85	0.856	0.861	0.866
0.05	0.81	0.81	0.81	0.81	0.81	0.811	0.812	0.814	0.816	0.819	0.822	0.826	0.83	0.835	0.84	0.846	0.851	0.857	0.861	0.866
0.06	0.827	0.827	0.827	0.827	0.827	0.828	0.828	0.829	0.831	0.832	0.834	0.837	0.84	0.843	0.846	0.851	0.855	0.859	0.863	0.868
0.07	0.841	0.841	0.841	0.841	0.841	0.842	0.842	0.843	0.844	0.845	0.846	0.847	0.849	0.851	0.854	0.857	0.86	0.864	0.867	0.870
0.08	0.852	0.852	0.852	0.853	0.853	0.853	0.853	0.853	0.854	0.855	0.855	0.856	0.858	0.859	0.861	0.863	0.866	0.868	0.871	0.874
0.09	0.863	0.863	0.863	0.863	0.863	0.863	0.863	0.864	0.864	0.864	0.865	0.866	0.867	0.868	0.869	0.871	0.872	0.874	0.876	0.878
0.1	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.873	0.873	0.873	0.873	0.874	0.875	0.875	0.876	0.878	0.879	0.881	0.882	0.884
0.11	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.881	0.881	0.881	0.881	0.882	0.883	0.883	0.884	0.885	0.886	0.887	0.888
0.12	0.886	0.886	0.886	0.886	0.887	0.887	0.887	0.887	0.887	0.887	0.887	0.888	0.888	0.888	0.889	0.89	0.891	0.891	0.892	0.893
0.13	0.893	0.893	0.893	0.893	0.893	0.893	0.893	0.893	0.893	0.893	0.894	0.894	0.894	0.895	0.895	0.895	0.896	0.897	0.898	0.898
0.14	0.898	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.899	0.9	0.9	0.9	0.901	0.901	0.901	0.902	0.903	0.903
0.15	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.905	0.905	0.905	0.905	0.906	0.906	0.907	0.907	0.908
0.16	0.908	0.909	0.909	0.909	0.909	0.909	0.909	0.909	0.909	0.909	0.909	0.909	0.91	0.91	0.91	0.91	0.911	0.911	0.911	0.912
0.17	0.912	0.912	0.912	0.912	0.912	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.913	0.914	0.914	0.914	0.914	0.915	0.915	0.915
0.18	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.918	0.918	0.918	0.918	0.919	0.919	0.919	0.919
0.19	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.922	0.922	0.922	0.922	0.922	0.922	0.923	0.923	0.923
0.2	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.924	0.925	0.925	0.925	0.925	0.925	0.925	0.926	0.926	0.926

Table E.128 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a: Xdouble-Exp.

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.904	0.904	0.907	0.913	0.92	0.929	0.936	0.943	0.948	0.952	0.956	0.959	0.963	0.965	0.967	0.969	0.971	0.973	0.974	0.976
0.02	0.938	0.938	0.938	0.938	0.94	0.941	0.944	0.947	0.95	0.953	0.957	0.959	0.963	0.965	0.967	0.969	0.971	0.973	0.974	0.976
0.03	0.953	0.953	0.953	0.953	0.953	0.954	0.954	0.955	0.956	0.958	0.959	0.961	0.963	0.965	0.967	0.969	0.971	0.973	0.974	0.976
0.04	0.962	0.962	0.962	0.962	0.962	0.962	0.962	0.963	0.963	0.964	0.964	0.965	0.967	0.968	0.969	0.97	0.972	0.973	0.974	0.976
0.05	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.968	0.969	0.969	0.969	0.97	0.97	0.971	0.972	0.972	0.973	0.974	0.975	0.977
0.06	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.974	0.974	0.975	0.975	0.976	0.976	0.977	0.978
0.07	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.977	0.977	0.977	0.977	0.977	0.977	0.977	0.978	0.978	0.978	0.979	0.979
0.08	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.981	0.981	0.981
0.09	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.983
0.1	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984	0.984
0.11	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.986	0.986	0.986
0.12	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987
0.13	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988
0.14	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989
0.15	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.990
0.16	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.991
0.17	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
0.18	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
0.19	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993
0.2	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993

Table E.129 Power Study: Sequential Test, n = 5 - H_0 : Gamam(3.5,1); H_a: XCauchy(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.407	0.44	0.464	0.481	0.496	0.51	0.522	0.533	0.544	0.554	0.564	0.572	0.581	0.59	0.597	0.605	0.612	0.619	0.625	0.632
0.02	0.443	0.448	0.465	0.482	0.497	0.511	0.523	0.534	0.545	0.555	0.565	0.573	0.582	0.59	0.598	0.605	0.612	0.619	0.625	0.632
0.03	0.467	0.472	0.475	0.483	0.498	0.512	0.524	0.535	0.546	0.556	0.566	0.574	0.583	0.591	0.599	0.606	0.613	0.62	0.626	0.633
0.04	0.484	0.488	0.492	0.495	0.501	0.513	0.525	0.536	0.547	0.557	0.567	0.575	0.584	0.592	0.6	0.607	0.614	0.621	0.627	0.634
0.05	0.498	0.502	0.506	0.509	0.513	0.518	0.526	0.537	0.547	0.558	0.568	0.576	0.585	0.593	0.6	0.608	0.614	0.622	0.628	0.635
0.06	0.51	0.515	0.518	0.521	0.524	0.528	0.532	0.539	0.548	0.559	0.569	0.577	0.586	0.594	0.601	0.609	0.615	0.623	0.629	0.636
0.07	0.52	0.524	0.528	0.531	0.534	0.537	0.541	0.545	0.552	0.56	0.569	0.578	0.587	0.595	0.602	0.61	0.616	0.624	0.63	0.636
0.08	0.53	0.535	0.539	0.542	0.545	0.548	0.551	0.555	0.559	0.564	0.572	0.579	0.588	0.596	0.603	0.61	0.617	0.624	0.631	0.637
0.09	0.539	0.544	0.548	0.551	0.554	0.557	0.56	0.563	0.567	0.571	0.576	0.582	0.589	0.596	0.604	0.611	0.618	0.625	0.631	0.638
0.1	0.549	0.554	0.557	0.56	0.564	0.566	0.57	0.573	0.576	0.579	0.583	0.587	0.593	0.599	0.605	0.612	0.619	0.626	0.632	0.639
0.11	0.558	0.563	0.567	0.57	0.573	0.576	0.579	0.582	0.585	0.588	0.591	0.595	0.599	0.604	0.609	0.614	0.62	0.627	0.633	0.640
0.12	0.567	0.572	0.575	0.578	0.582	0.585	0.588	0.591	0.594	0.596	0.599	0.602	0.606	0.609	0.613	0.618	0.623	0.629	0.634	0.641
0.13	0.574	0.579	0.582	0.586	0.589	0.592	0.595	0.598	0.601	0.603	0.606	0.609	0.612	0.615	0.618	0.622	0.626	0.631	0.636	0.642
0.14	0.582	0.587	0.59	0.593	0.597	0.6	0.603	0.606	0.609	0.611	0.614	0.617	0.619	0.622	0.624	0.628	0.631	0.636	0.64	0.645
0.15	0.589	0.594	0.597	0.601	0.604	0.607	0.61	0.613	0.616	0.618	0.621	0.624	0.626	0.628	0.631	0.634	0.637	0.641	0.645	0.649
0.16	0.596	0.601	0.604	0.607	0.61	0.613	0.617	0.62	0.622	0.625	0.628	0.63	0.633	0.635	0.637	0.64	0.643	0.646	0.65	0.654
0.17	0.603	0.607	0.611	0.614	0.617	0.62	0.623	0.626	0.629	0.632	0.635	0.637	0.639	0.641	0.644	0.647	0.649	0.652	0.655	0.659
0.18	0.608	0.613	0.617	0.62	0.623	0.626	0.629	0.632	0.635	0.637	0.641	0.643	0.645	0.647	0.65	0.652	0.654	0.658	0.66	0.664
0.19	0.614	0.619	0.622	0.625	0.628	0.631	0.635	0.638	0.64	0.643	0.646	0.648	0.651	0.653	0.655	0.658	0.66	0.663	0.666	0.669
0.2	0.62	0.624	0.628	0.631	0.634	0.637	0.64	0.643	0.646	0.649	0.652	0.654	0.656	0.658	0.661	0.663	0.665	0.668	0.671	0.674

Table E.130 Power Study: Sequential Test, n = 15 - H_0 : Gamma(3.5,1); H_a: XCauchy(0,1)

Skewness Test Significance Level (α)	Kurtosis Test Significance Level (α) 0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.784	0.788	0.796	0.805	0.815	0.824	0.832	0.84	0.847	0.853	0.862	0.867	0.873	0.877	0.881	0.884	0.888	0.891	0.893	0.896
0.02	0.814	0.814	0.816	0.82	0.825	0.829	0.835	0.84	0.847	0.853	0.862	0.867	0.873	0.877	0.881	0.884	0.888	0.891	0.893	0.896
0.03	0.839	0.839	0.839	0.841	0.843	0.845	0.848	0.852	0.856	0.859	0.864	0.867	0.873	0.877	0.881	0.884	0.888	0.891	0.893	0.896
0.04	0.854	0.854	0.854	0.854	0.855	0.856	0.858	0.86	0.863	0.865	0.868	0.871	0.875	0.877	0.881	0.884	0.888	0.891	0.893	0.896
0.05	0.863	0.864	0.864	0.864	0.864	0.865	0.866	0.867	0.869	0.871	0.873	0.875	0.877	0.879	0.882	0.885	0.888	0.891	0.894	0.896
0.06	0.871	0.871	0.871	0.872	0.872	0.872	0.873	0.874	0.875	0.876	0.877	0.879	0.881	0.882	0.884	0.886	0.889	0.891	0.894	0.896
0.07	0.878	0.878	0.878	0.878	0.879	0.879	0.879	0.88	0.88	0.881	0.882	0.883	0.885	0.886	0.887	0.889	0.891	0.893	0.894	0.896
0.08	0.883	0.883	0.884	0.884	0.884	0.884	0.884	0.885	0.885	0.886	0.887	0.887	0.888	0.889	0.891	0.892	0.893	0.895	0.896	0.898
0.09	0.888	0.889	0.889	0.889	0.889	0.889	0.889	0.89	0.89	0.89	0.891	0.891	0.892	0.893	0.894	0.895	0.896	0.897	0.899	0.900
0.1	0.891	0.892	0.892	0.892	0.892	0.892	0.893	0.893	0.893	0.893	0.894	0.894	0.895	0.895	0.896	0.897	0.898	0.899	0.9	0.902
0.11	0.895	0.896	0.896	0.896	0.896	0.896	0.897	0.897	0.897	0.897	0.898	0.898	0.898	0.899	0.9	0.901	0.901	0.902	0.903	0.904
0.12	0.899	0.899	0.9	0.9	0.9	0.9	0.9	0.901	0.901	0.901	0.901	0.901	0.902	0.902	0.903	0.904	0.904	0.905	0.906	0.907
0.13	0.903	0.903	0.903	0.903	0.904	0.904	0.904	0.904	0.904	0.904	0.905	0.905	0.905	0.906	0.906	0.907	0.907	0.908	0.909	0.909
0.14	0.906	0.906	0.906	0.907	0.907	0.907	0.907	0.907	0.908	0.908	0.908	0.908	0.908	0.909	0.909	0.91	0.91	0.911	0.911	0.912
0.15	0.909	0.909	0.909	0.91	0.91	0.91	0.91	0.91	0.911	0.911	0.911	0.911	0.912	0.912	0.912	0.912	0.913	0.913	0.914	0.914
0.16	0.912	0.913	0.913	0.913	0.913	0.913	0.913	0.914	0.914	0.914	0.914	0.914	0.915	0.915	0.915	0.916	0.916	0.916	0.917	0.917
0.17	0.915	0.915	0.915	0.915	0.915	0.916	0.916	0.916	0.916	0.916	0.917	0.917	0.917	0.917	0.918	0.918	0.918	0.918	0.919	0.919
0.18	0.917	0.917	0.917	0.917	0.918	0.918	0.918	0.918	0.918	0.918	0.919	0.919	0.919	0.919	0.919	0.92	0.92	0.92	0.921	0.921
0.19	0.919	0.919	0.919	0.919	0.919	0.92	0.92	0.92	0.92	0.92	0.921	0.921	0.921	0.921	0.921	0.922	0.922	0.922	0.922	0.923
0.2	0.921	0.921	0.921	0.921	0.921	0.922	0.922	0.922	0.922	0.922	0.922	0.923	0.923	0.923	0.923	0.924	0.924	0.924	0.924	0.925

Table E.131 Power Study: Sequential Test, n = 25 - H_0 : Gamma(3.5,1); H_a: XCauchy(0,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.916	0.917	0.919	0.923	0.927	0.93	0.934	0.936	0.938	0.941	0.942	0.944	0.945	0.946	0.947	0.948	0.949	0.95	0.95	0.951
0.02	0.93	0.93	0.93	0.931	0.932	0.933	0.935	0.937	0.939	0.941	0.942	0.944	0.945	0.946	0.947	0.948	0.949	0.95	0.95	0.951
0.03	0.937	0.937	0.937	0.937	0.938	0.938	0.939	0.94	0.941	0.942	0.943	0.944	0.945	0.946	0.947	0.948	0.949	0.95	0.95	0.951
0.04	0.942	0.942	0.942	0.942	0.942	0.942	0.943	0.943	0.943	0.944	0.944	0.945	0.946	0.946	0.947	0.948	0.949	0.95	0.95	0.951
0.05	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.946	0.946	0.946	0.947	0.947	0.948	0.949	0.949	0.95	0.95	0.951
0.06	0.947	0.947	0.947	0.947	0.947	0.947	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.949	0.949	0.95	0.95	0.95	0.951	0.952
0.07	0.949	0.949	0.949	0.949	0.949	0.949	0.949	0.949	0.949	0.949	0.95	0.95	0.95	0.95	0.95	0.951	0.951	0.951	0.952	0.952
0.08	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.952	0.952	0.952	0.952
0.09	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.953	0.953	0.953
0.1	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.953	0.954	0.954	0.954
0.11	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954
0.12	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.955	0.955	0.955	0.955	0.955	0.955
0.13	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.956	0.956	0.956	0.956
0.14	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956
0.15	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.957	0.957	0.957	0.957	0.957	0.957	0.957
0.16	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957
0.17	0.957	0.957	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958
0.18	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958
0.19	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.959	0.959
0.2	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959

Table E.132 Power Study: Sequential Test, n = 50 - H_0 : Gamma(3.5,1); H_a: XCauchy(0,1)

	Kurtosis Test Significance Level (α)																			
Skewness Test Significance Level (α)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.01	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.02	0.934	0.934	0.934	0.934	0.934	0.934	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.03	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.04	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.05	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.06	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.07	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.08	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.09	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.1	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.11	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.12	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.13	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.14	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.15	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.16	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.17	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.18	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.19	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
0.2	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935

Appendix F. Power Comparison Plot: Sequential Test Power vs. Individual Test Power (Two-tailed)

F.1 H_0: Gamma (β =0.5)

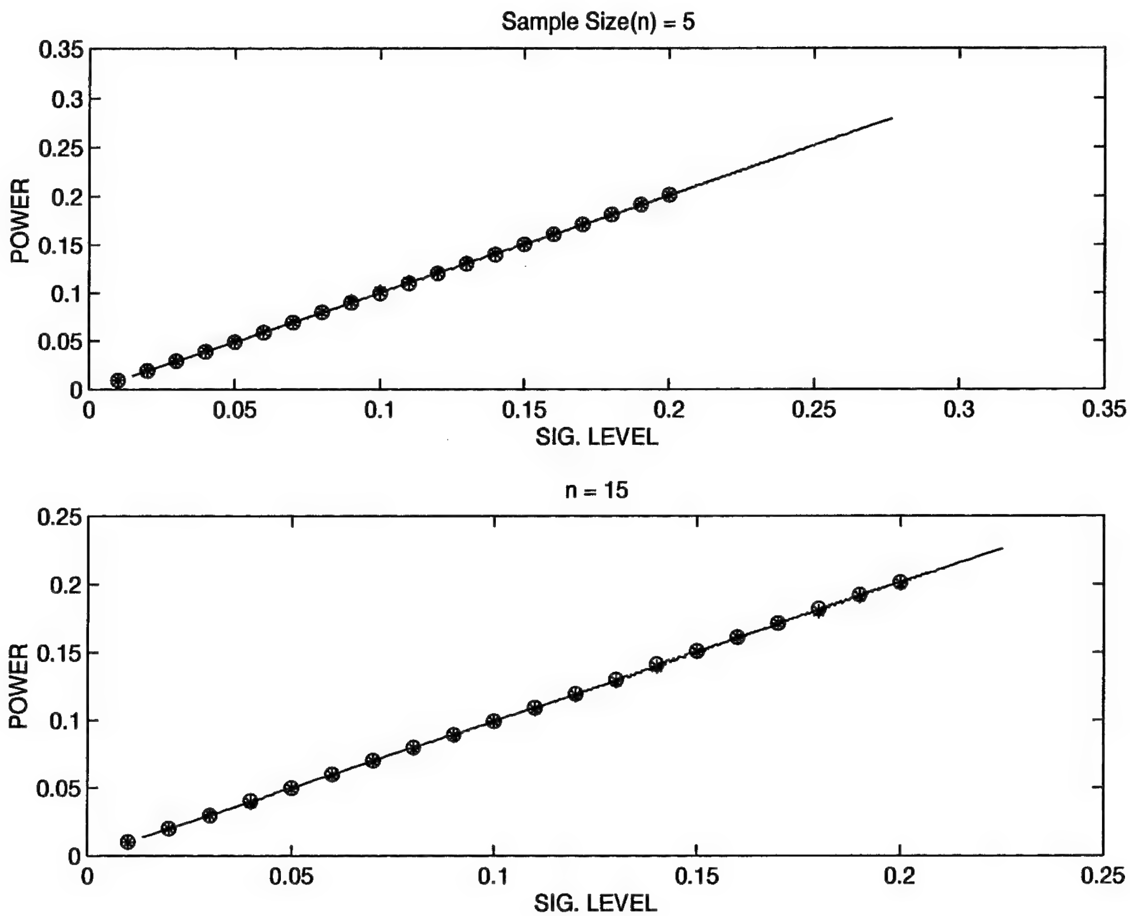


Figure F.1 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(0.5,1); $H_a : \chi^2(1)$

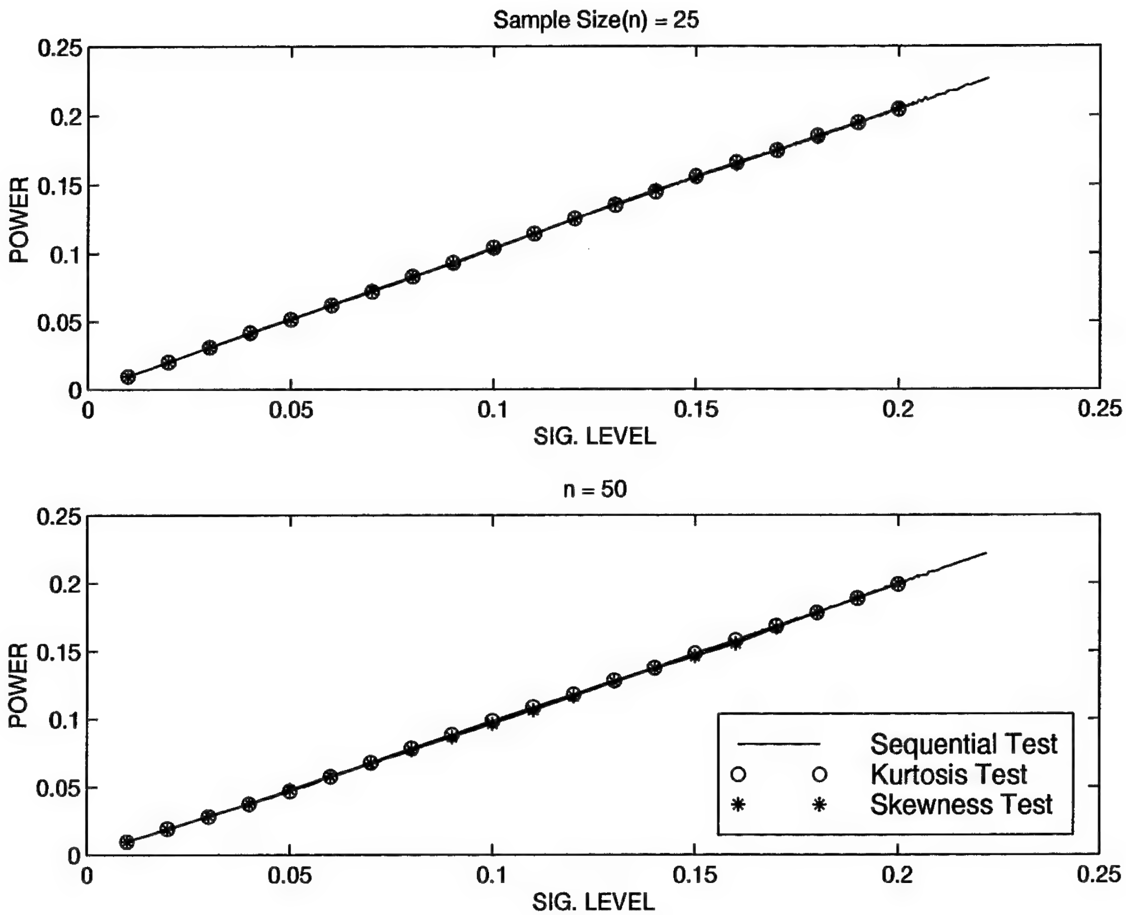


Figure F.2 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(0.5,1); $H_a : \chi^2(1)$

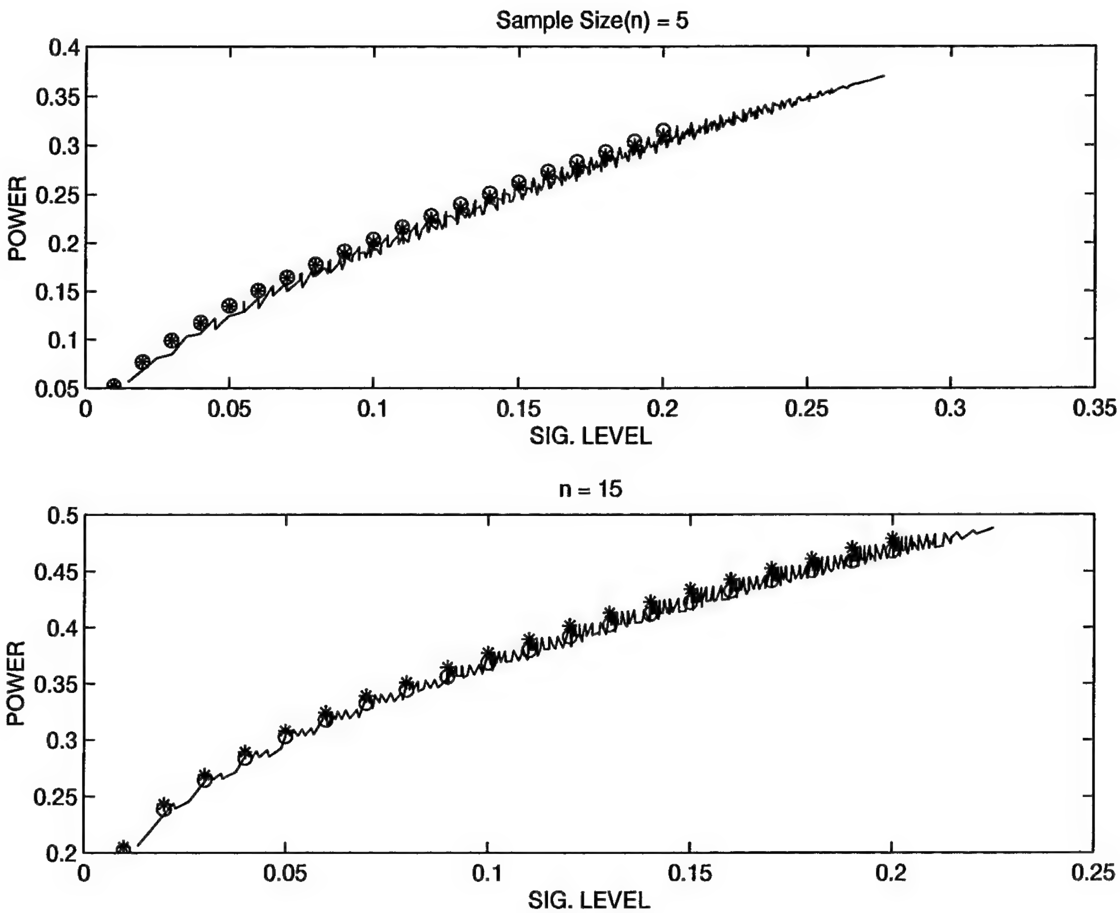


Figure F.3 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(0.5,1); H_a: XLogistic(0,1)

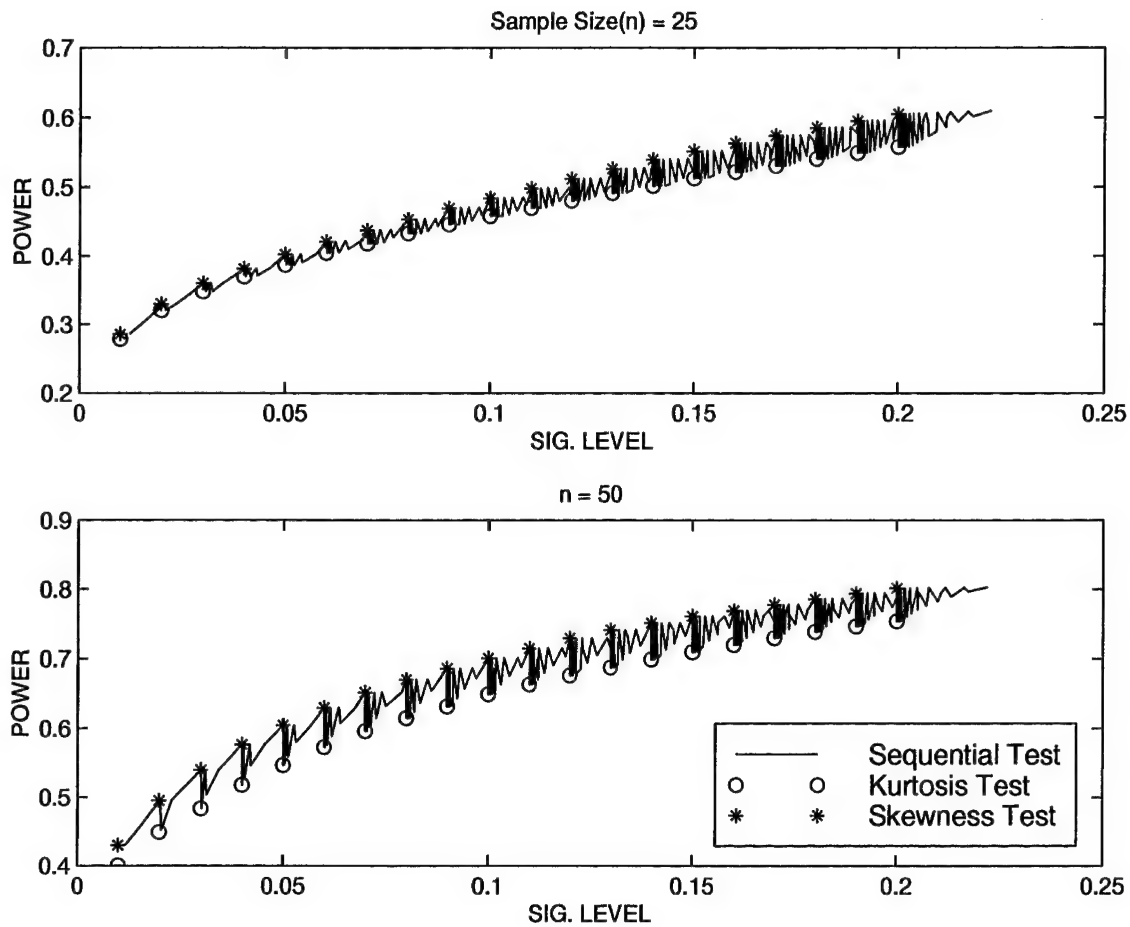


Figure F.4 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(0.5,1); H_a: XLogistic(0,1)

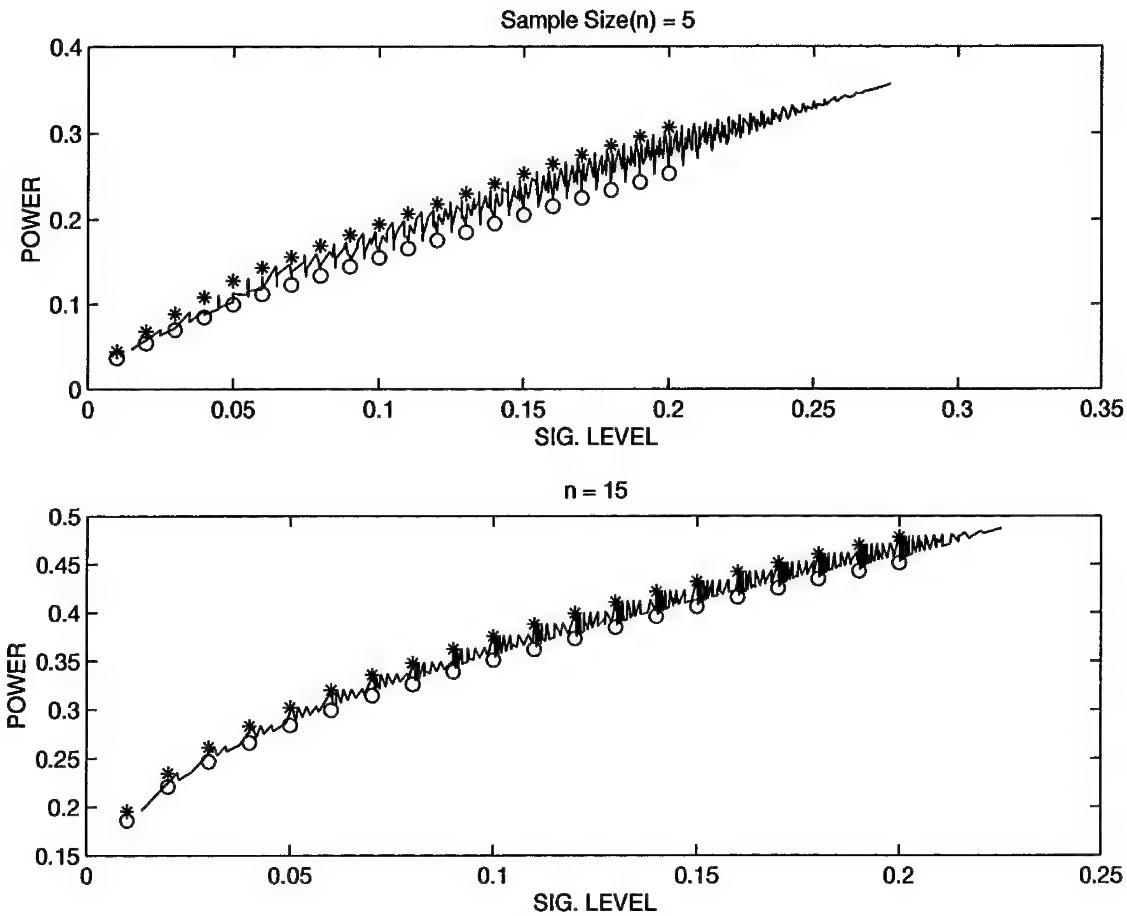


Figure F.5 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(0.5,1); H_a: Xdouble-Exp.

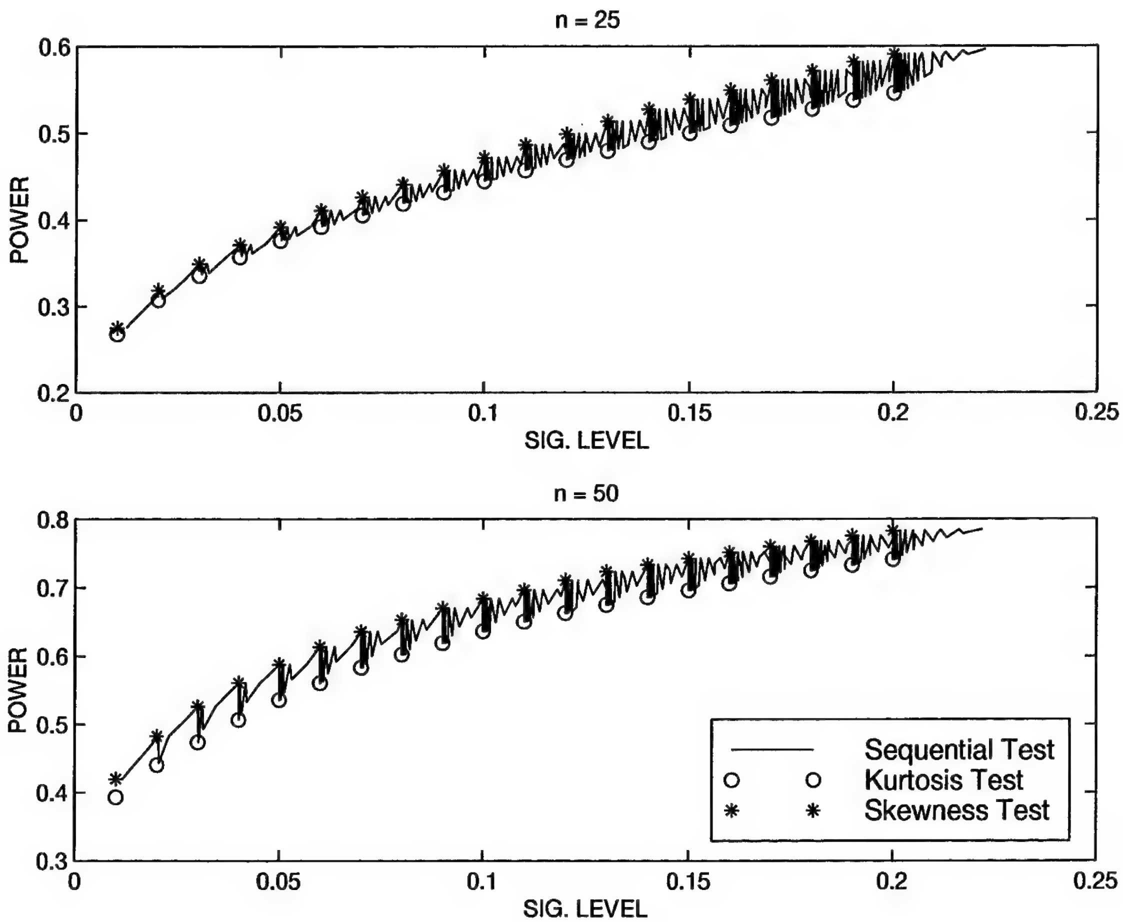


Figure F.6 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(0.5,1); H_a: Xdouble-Exp.

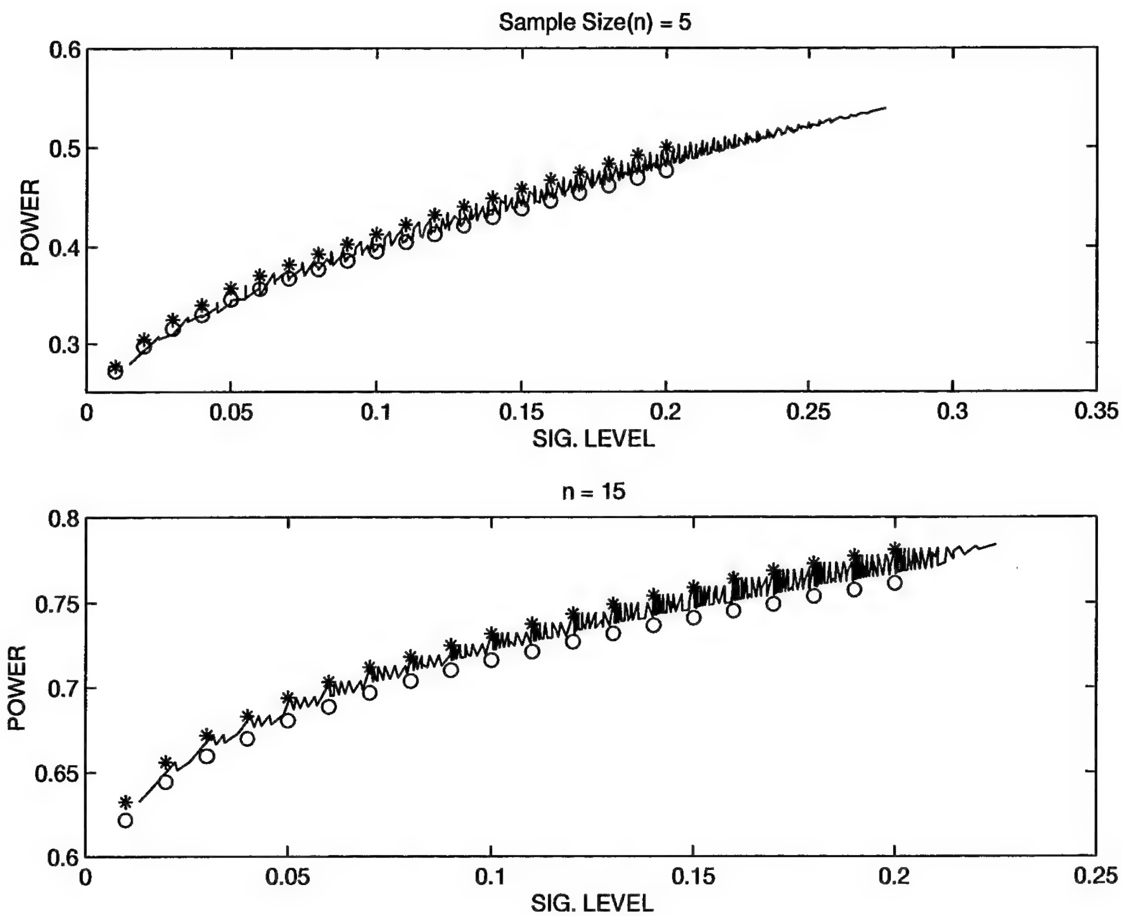


Figure F.7 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(0.5,1); H_a: XCauchy(0,1)

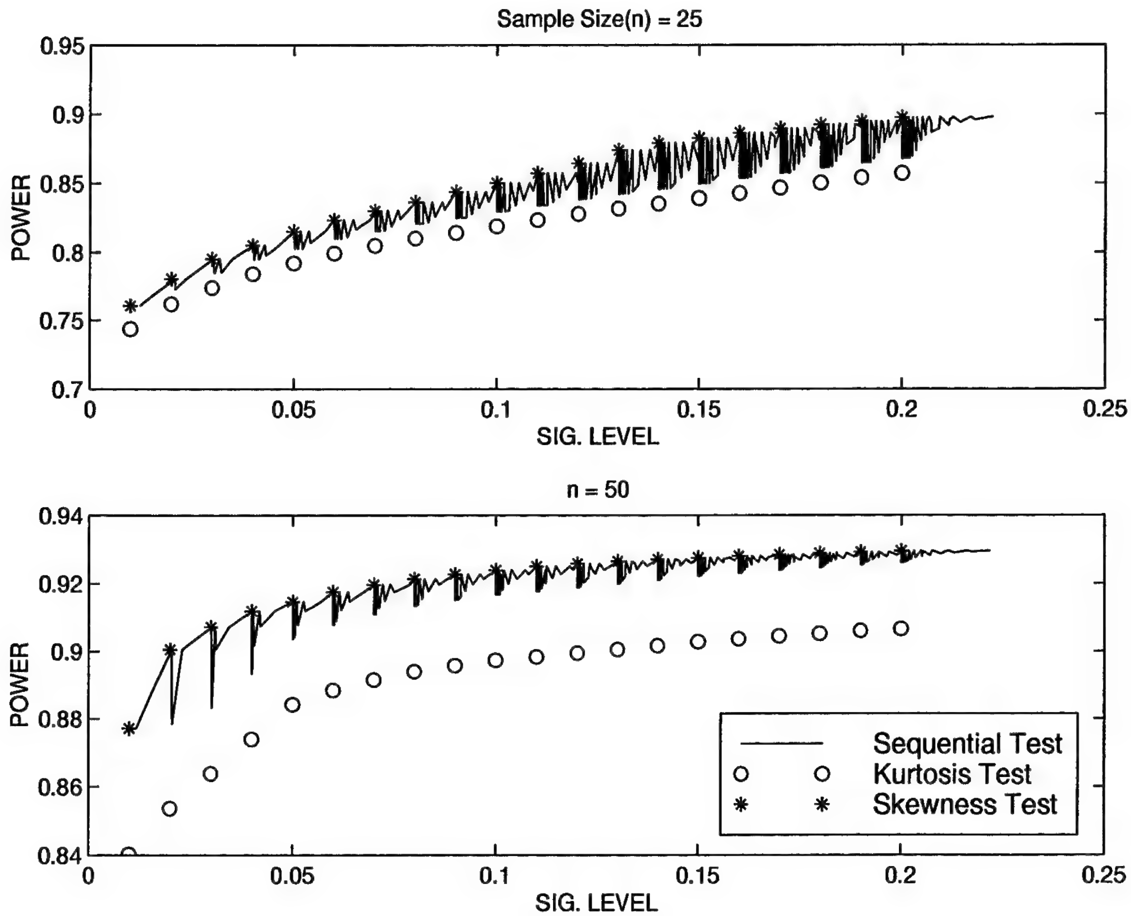


Figure F.8 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(0.5,1); H_a: XCauchy(0,1)

F.2 H_0: Gamma (β =1)

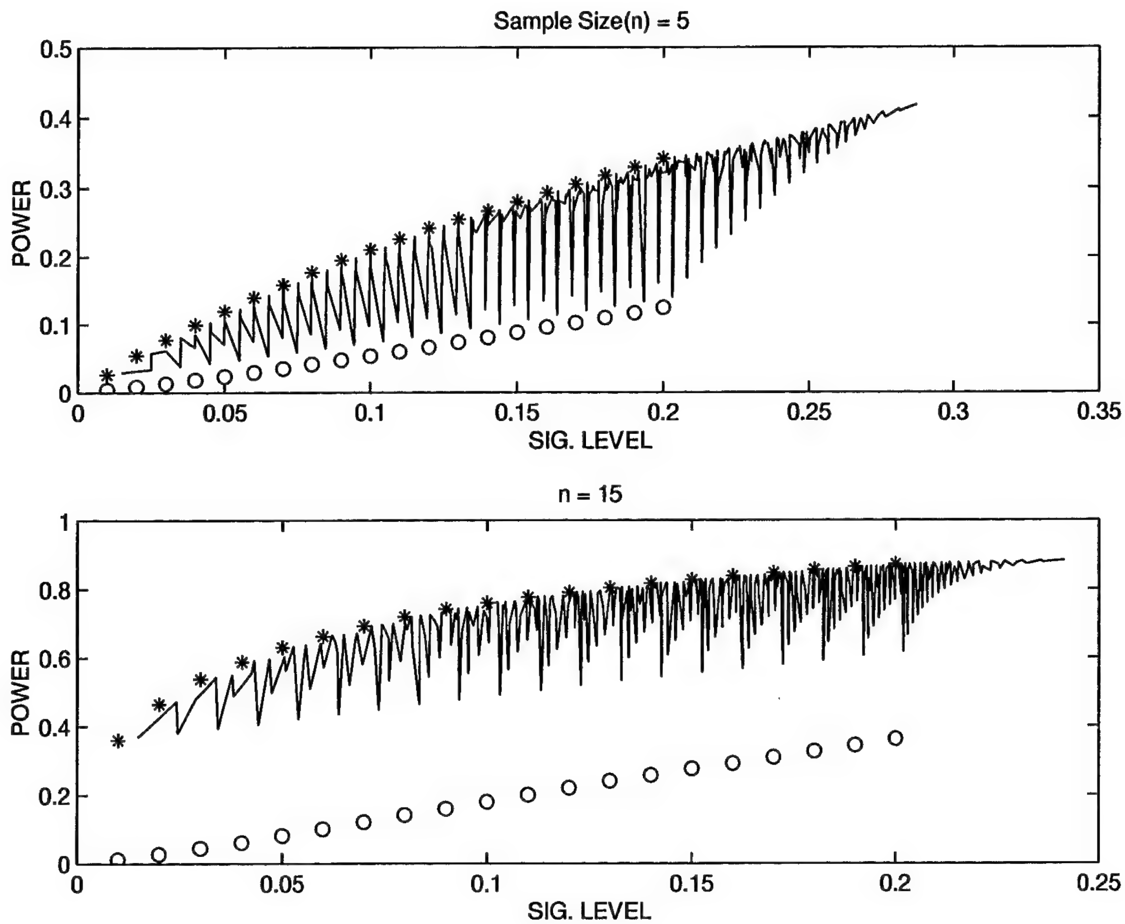


Figure F.9 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Beta(2,2)

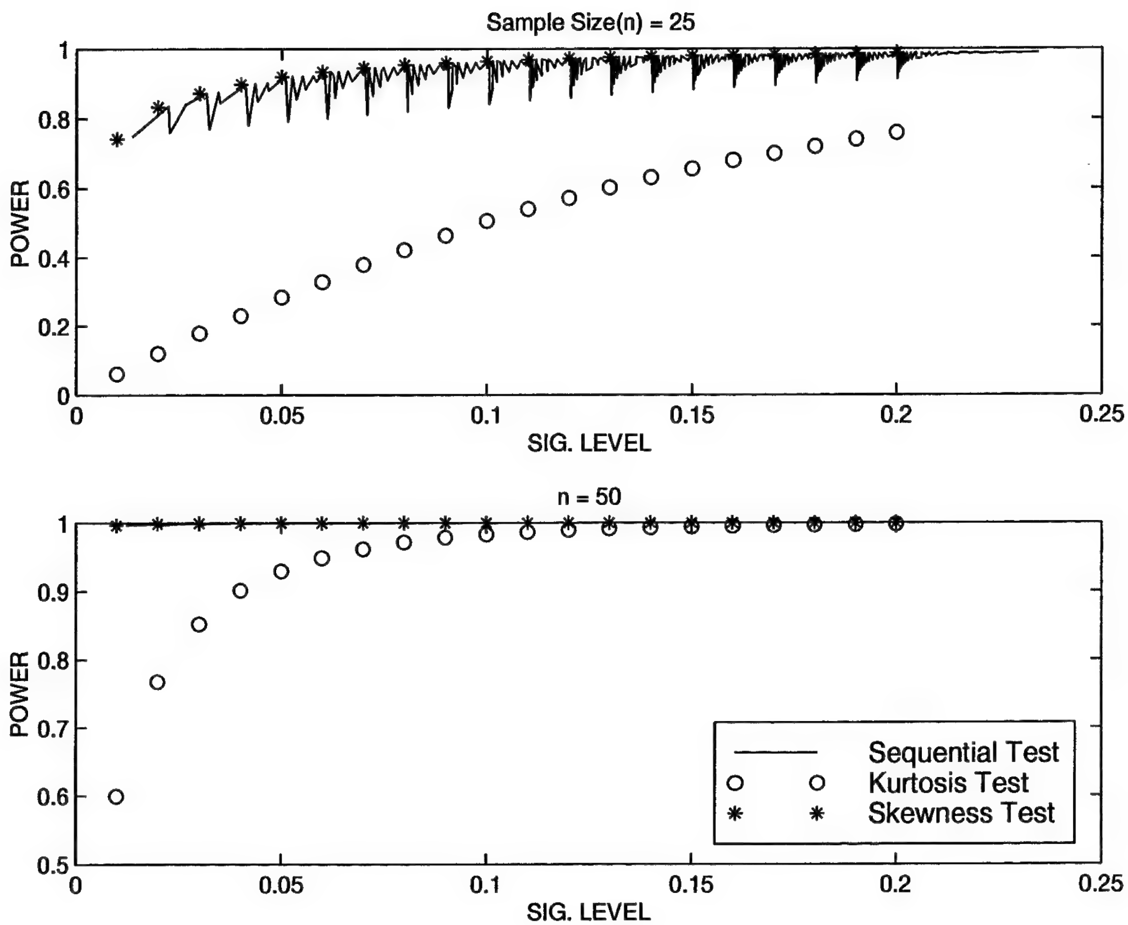


Figure F.10 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Beta(2,2)

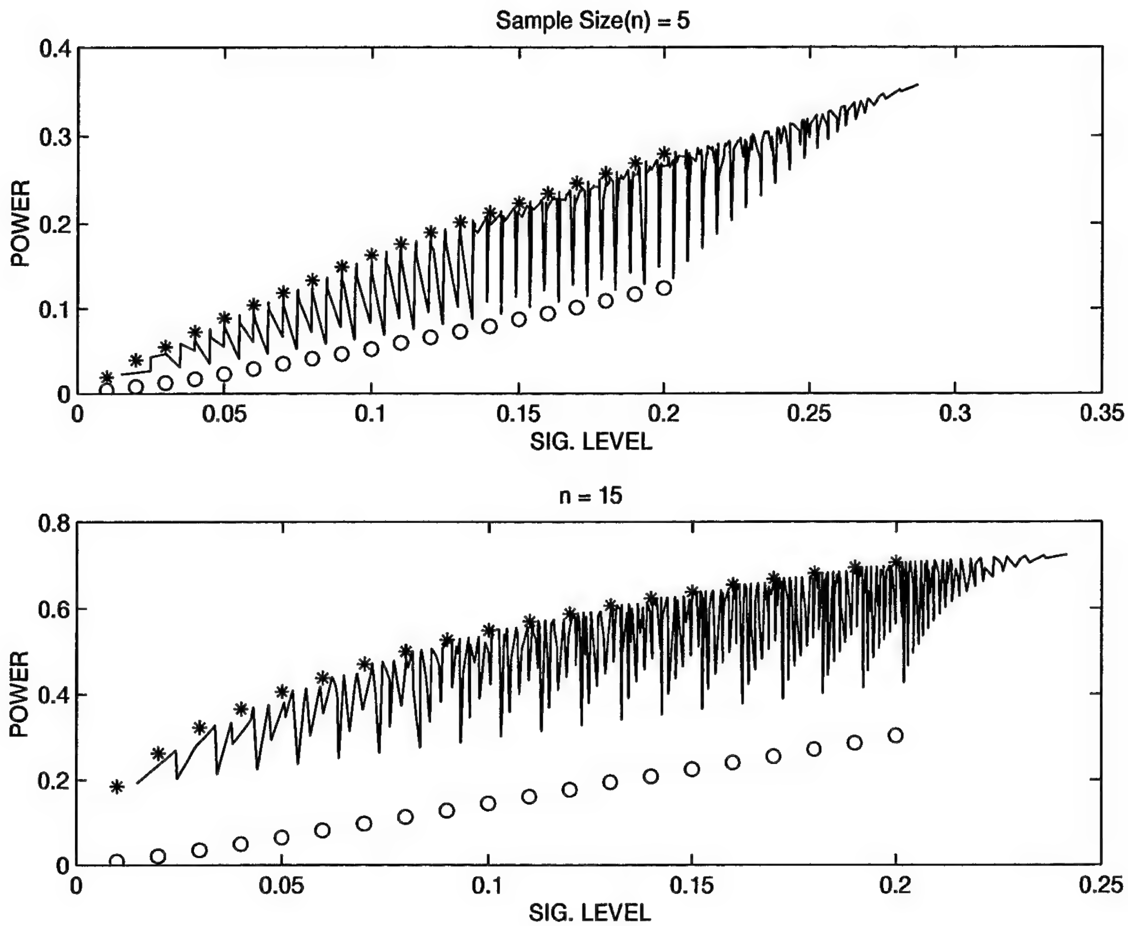


Figure F.11 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Beta(2,3)

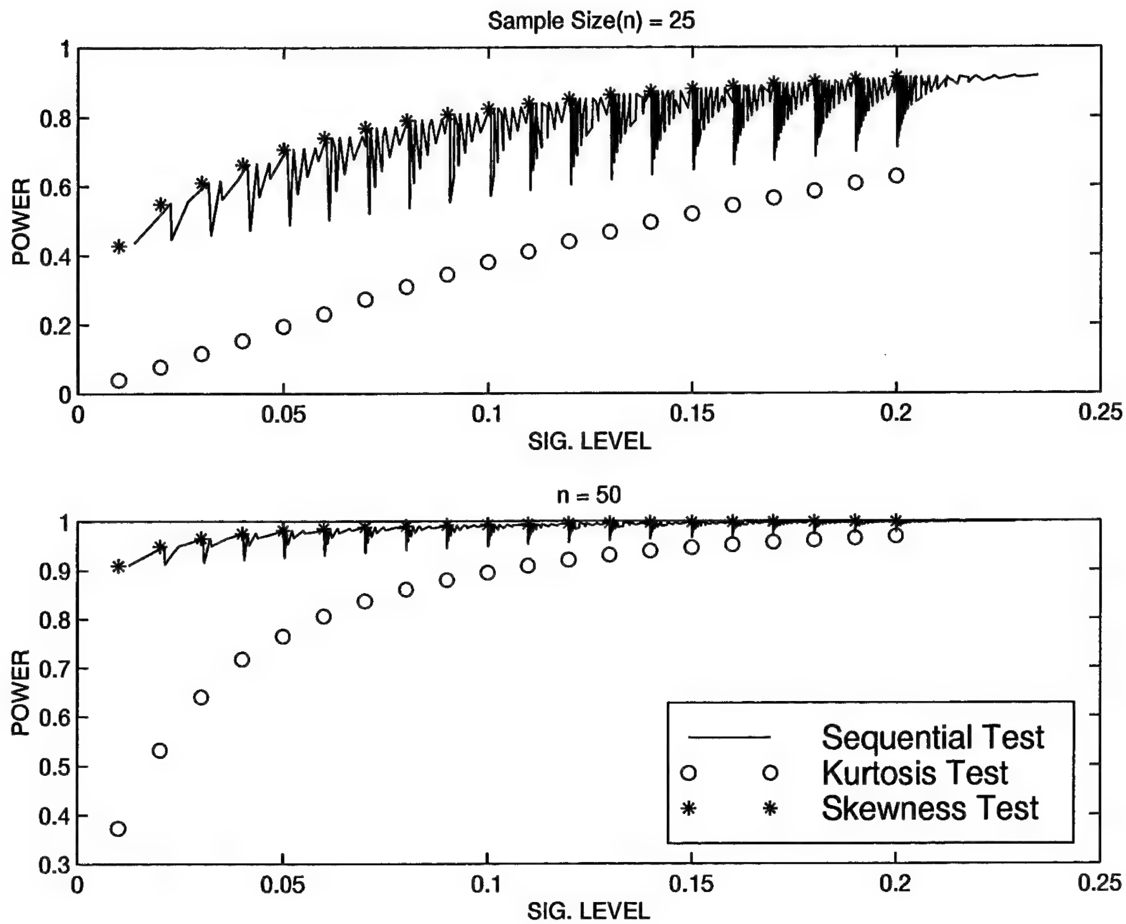


Figure F.12 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Beta(2,3)

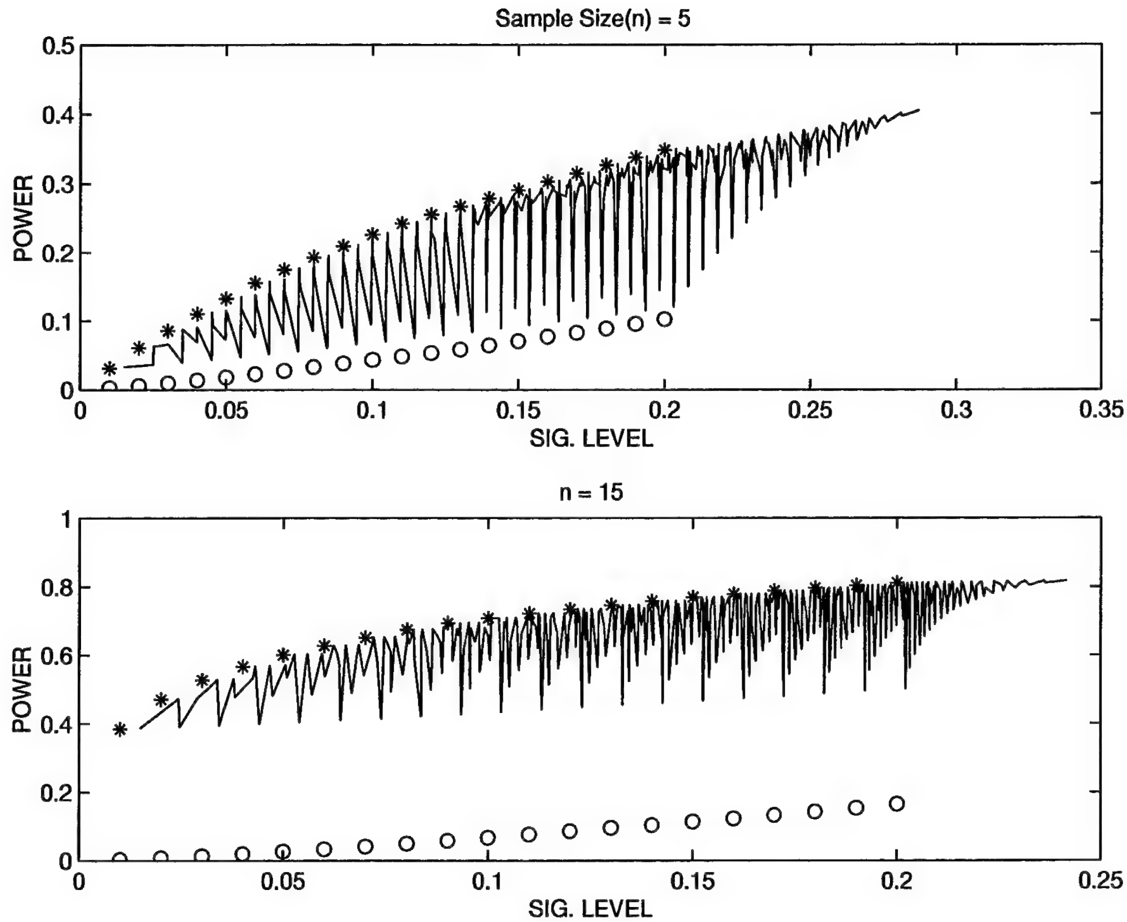


Figure F.13 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Normal(0,1)

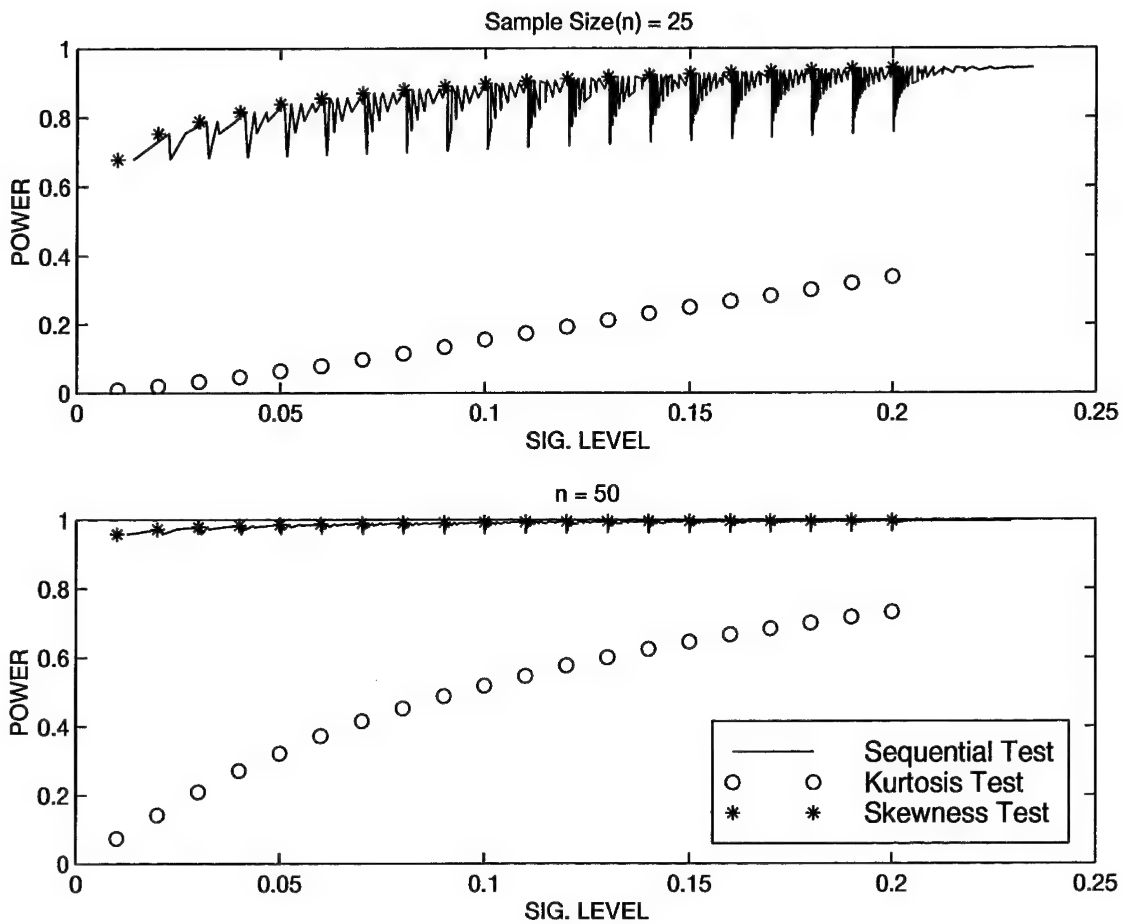


Figure F.14 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Normal(0,1)

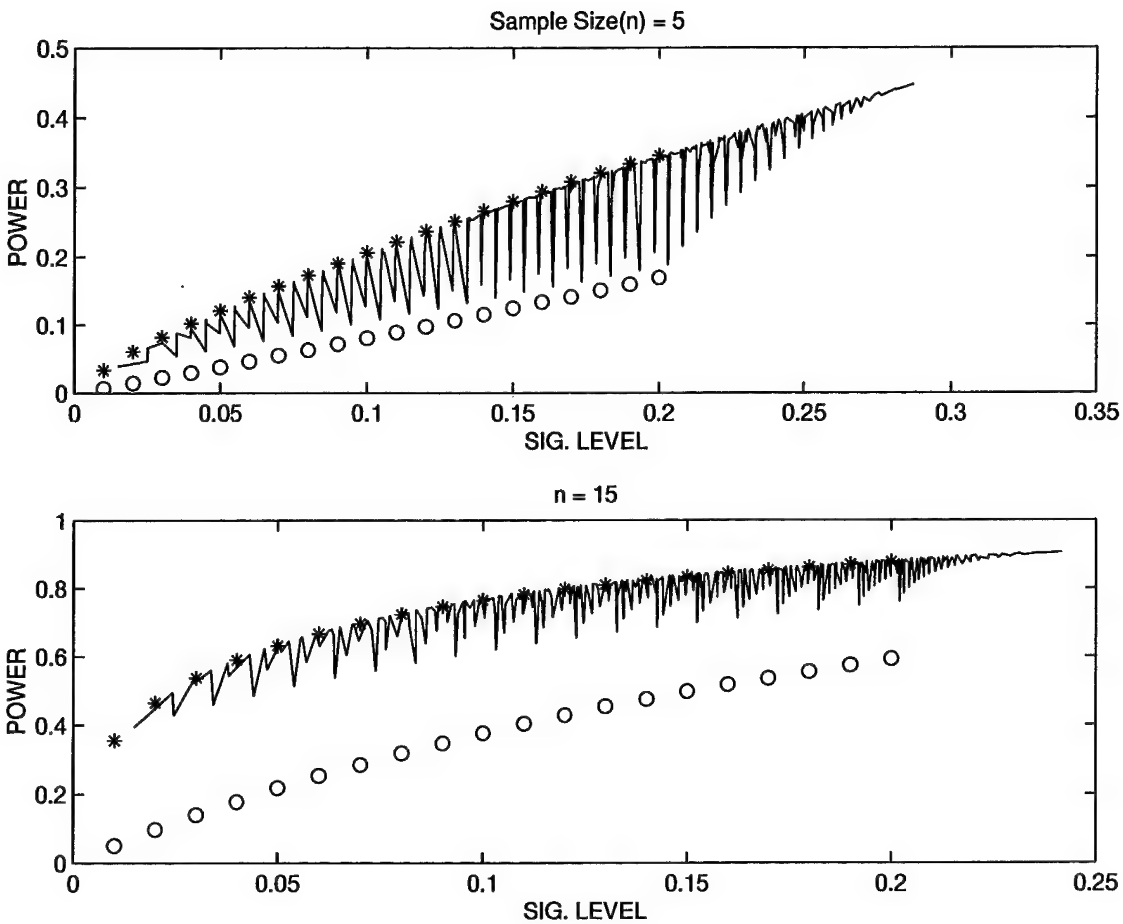


Figure F.15 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Uniform(0,2)

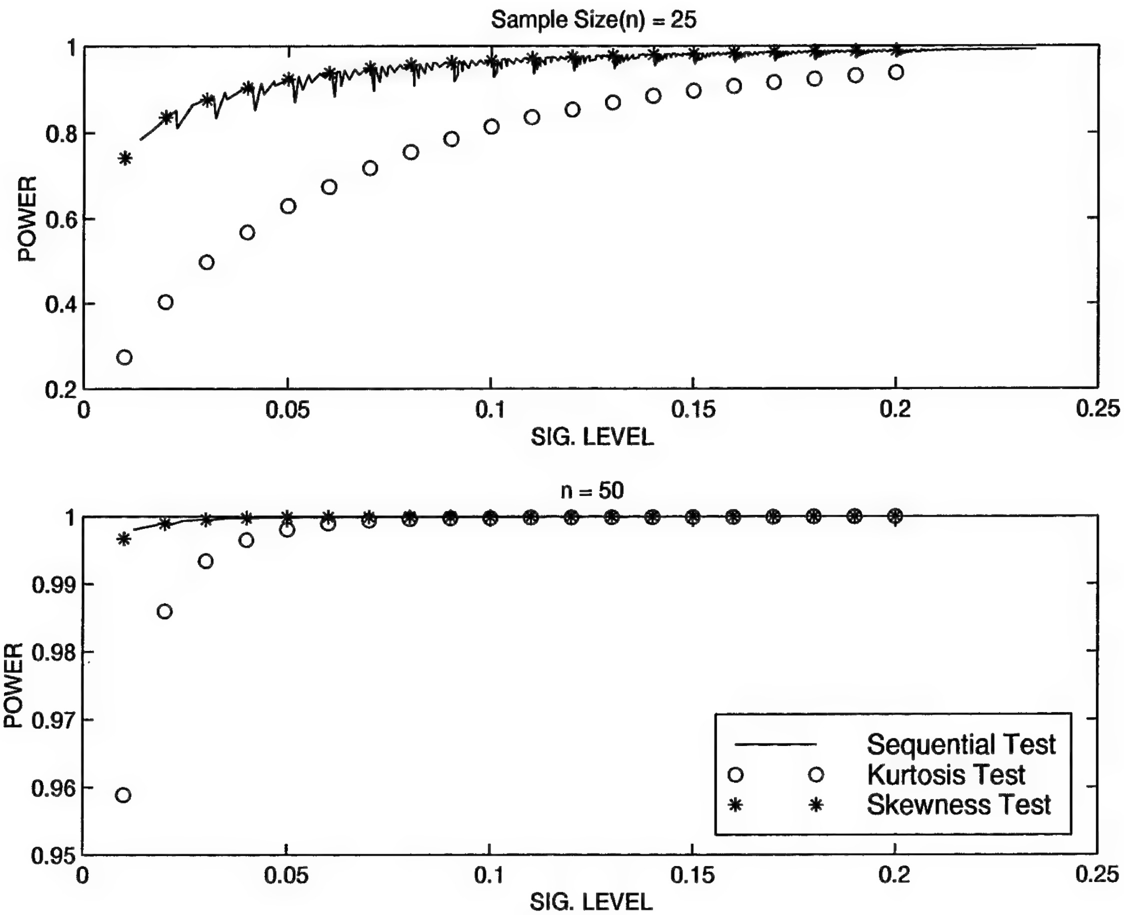


Figure F.16 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Uniform(0,2)

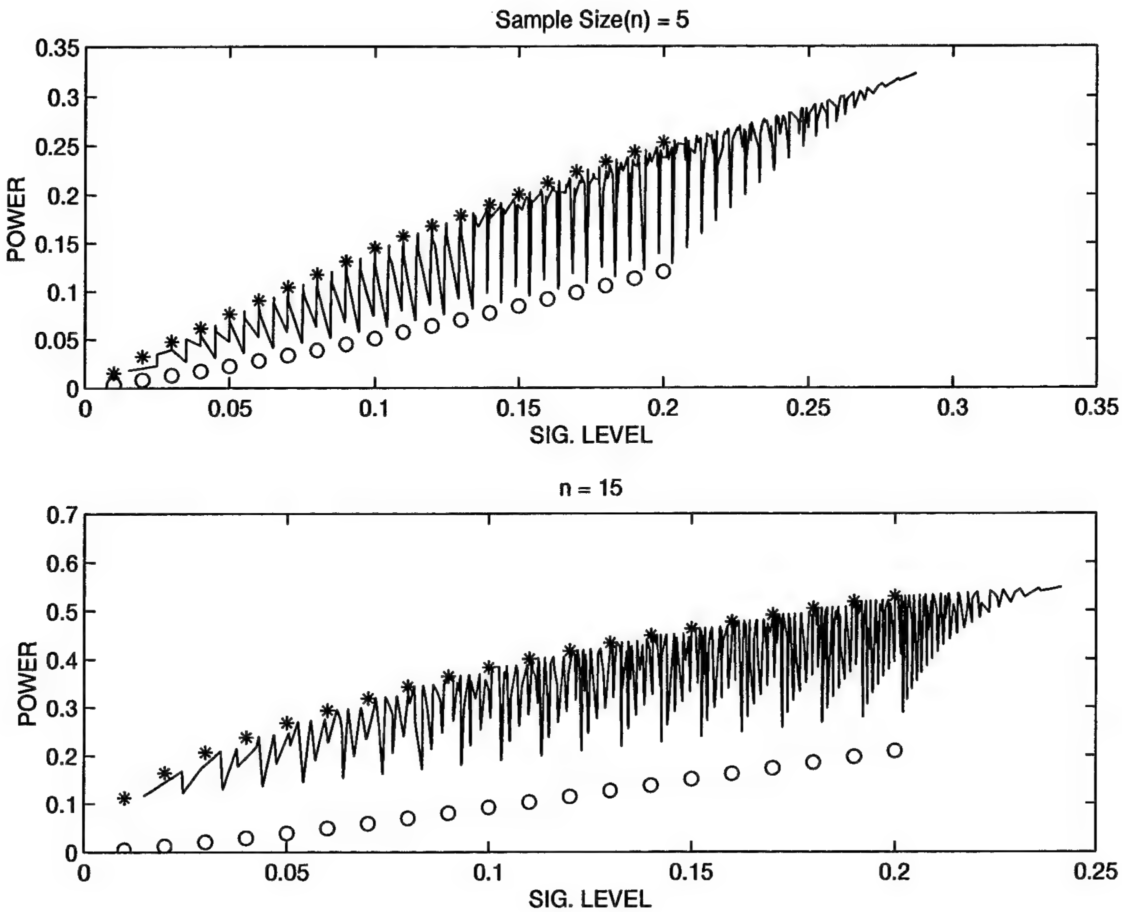


Figure F.17 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Weibull(2,1)

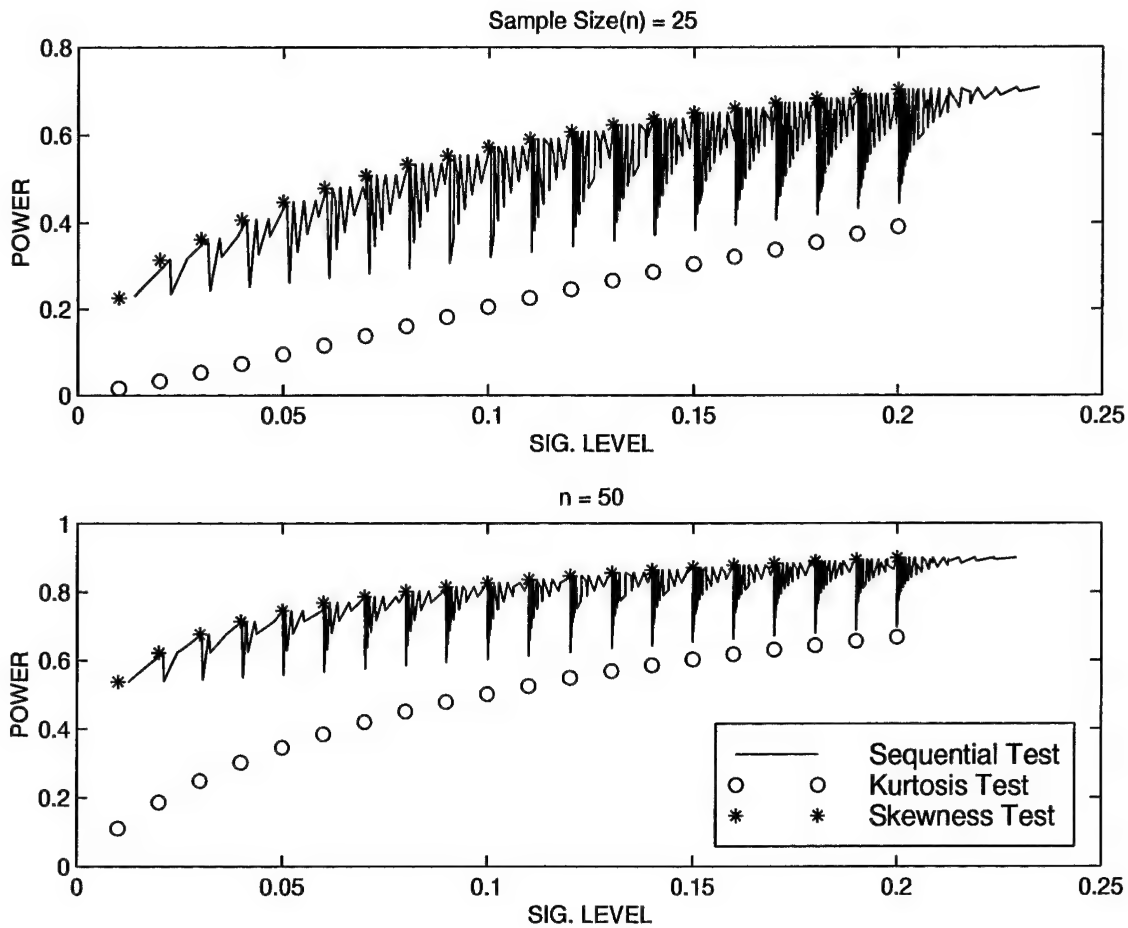


Figure F.18 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Weibull(2,1)

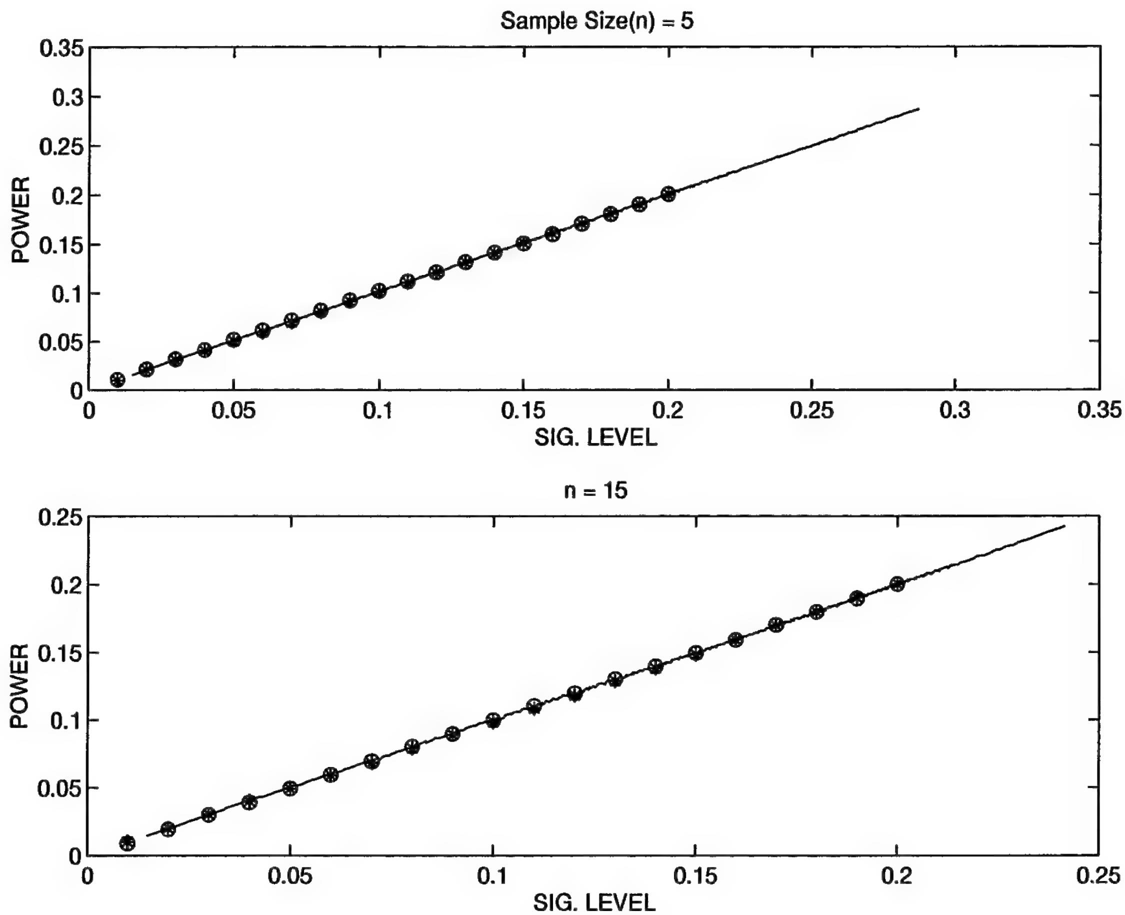


Figure F.19 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Gamma(1,1)

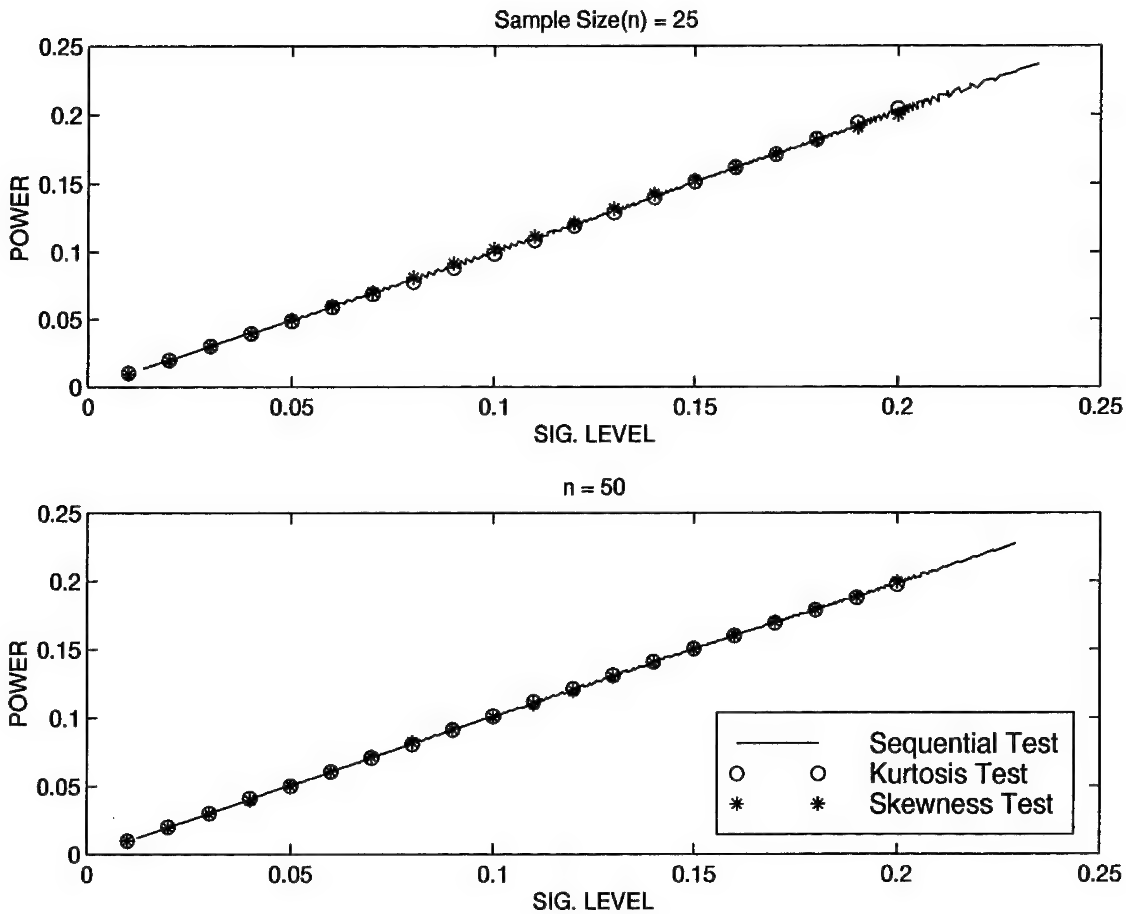


Figure F.20 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Gamma(1,1)

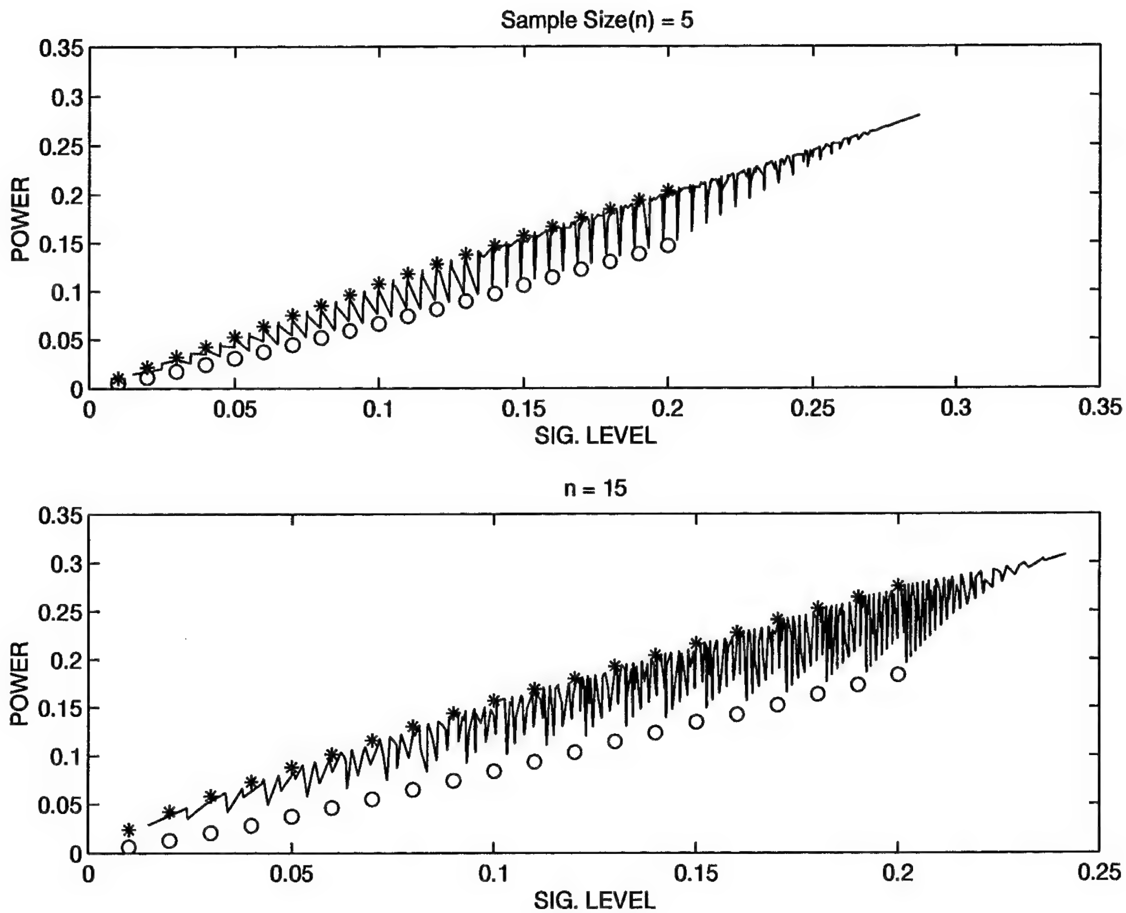


Figure F.21   Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Gamma(2,1)

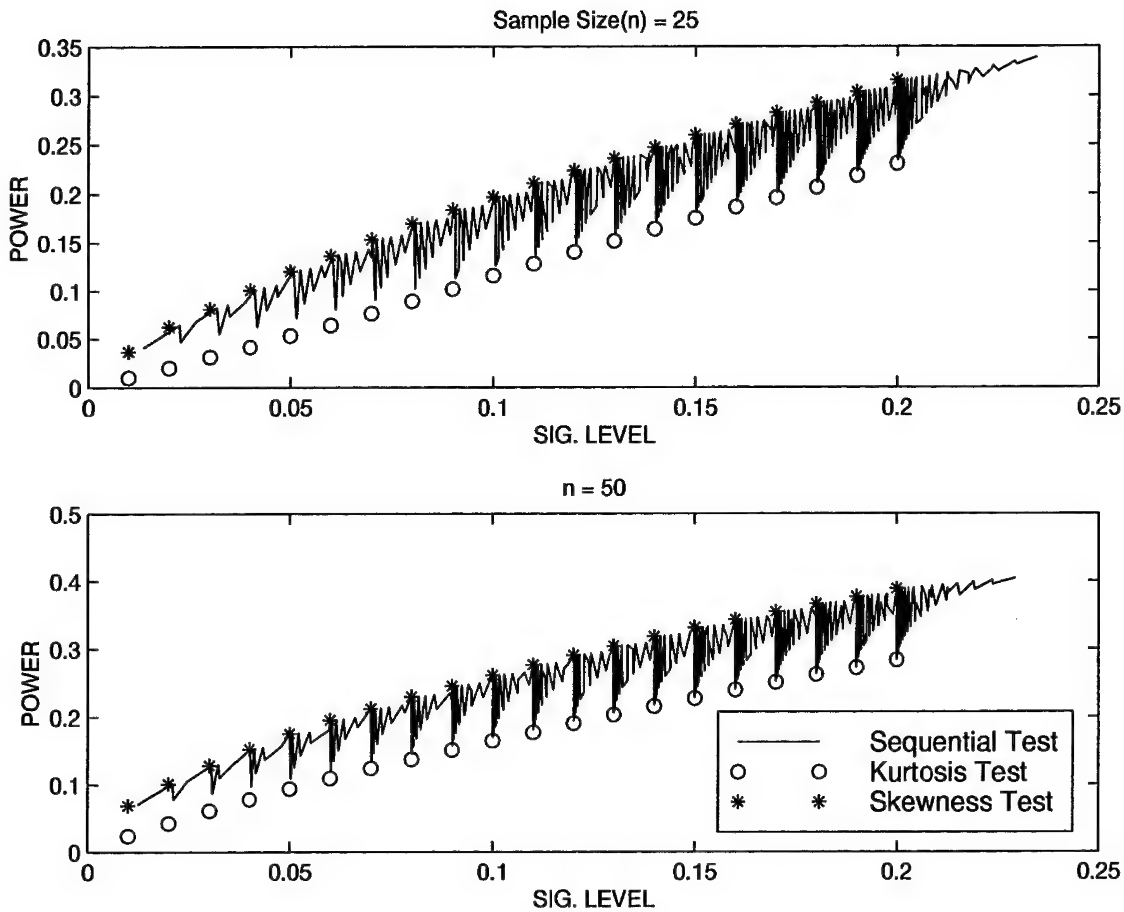


Figure F.22 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Gamma(2,1)

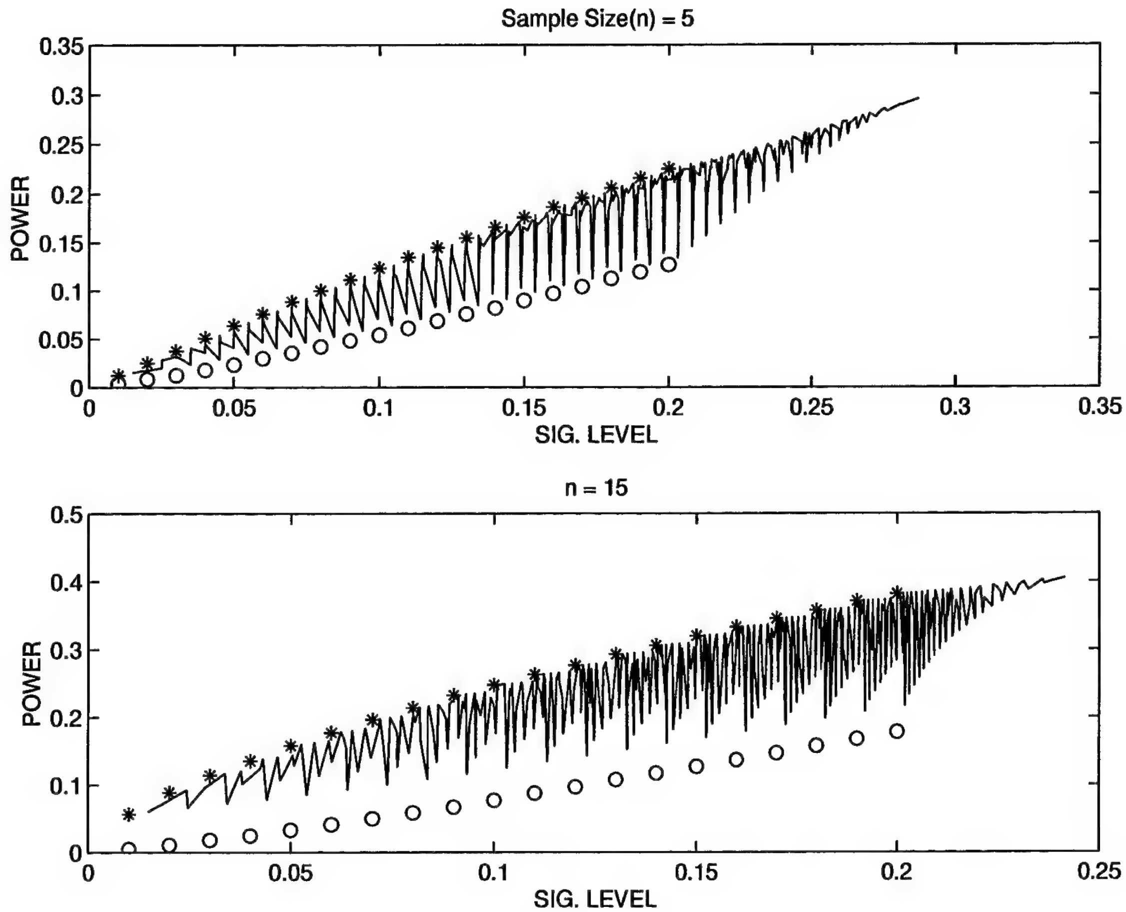


Figure F.23 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Gamma(3.5,1)

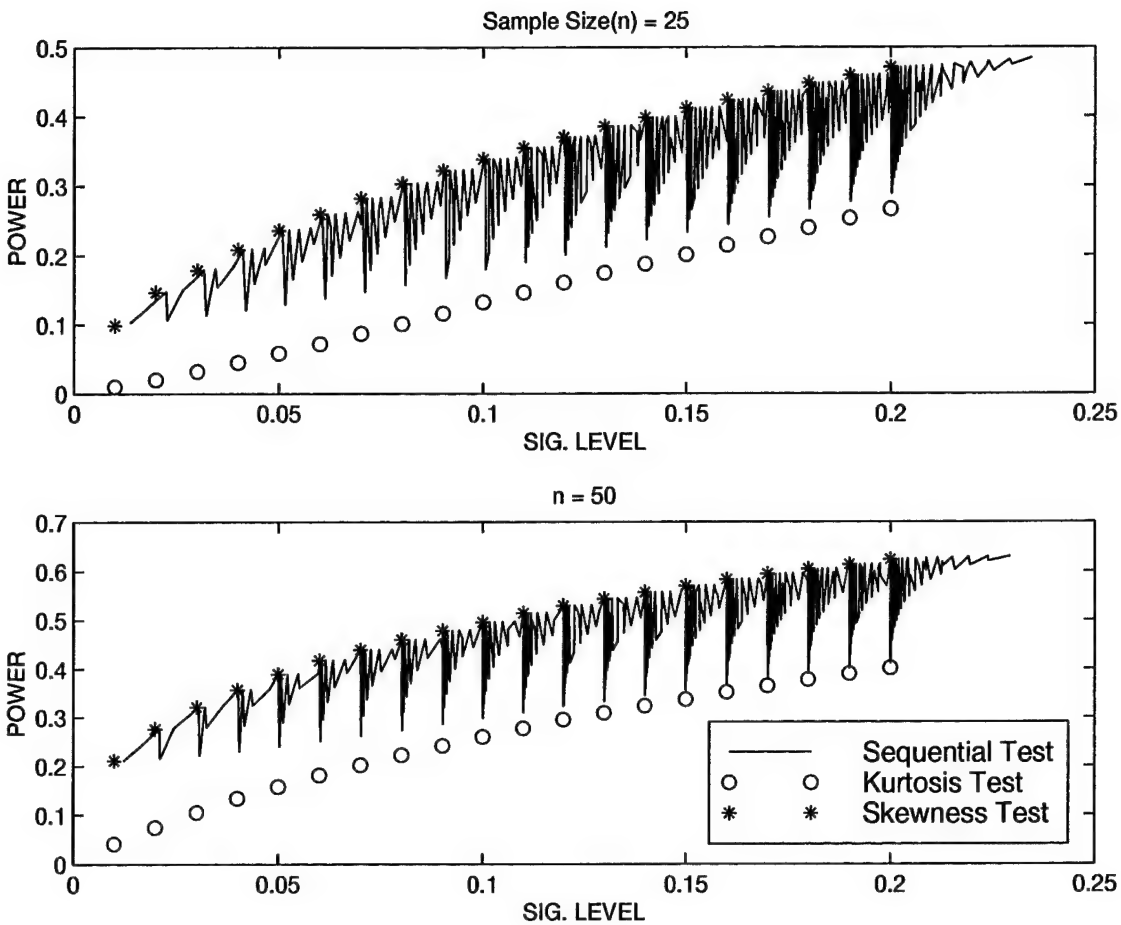


Figure F.24 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Gamma(3.5,1)

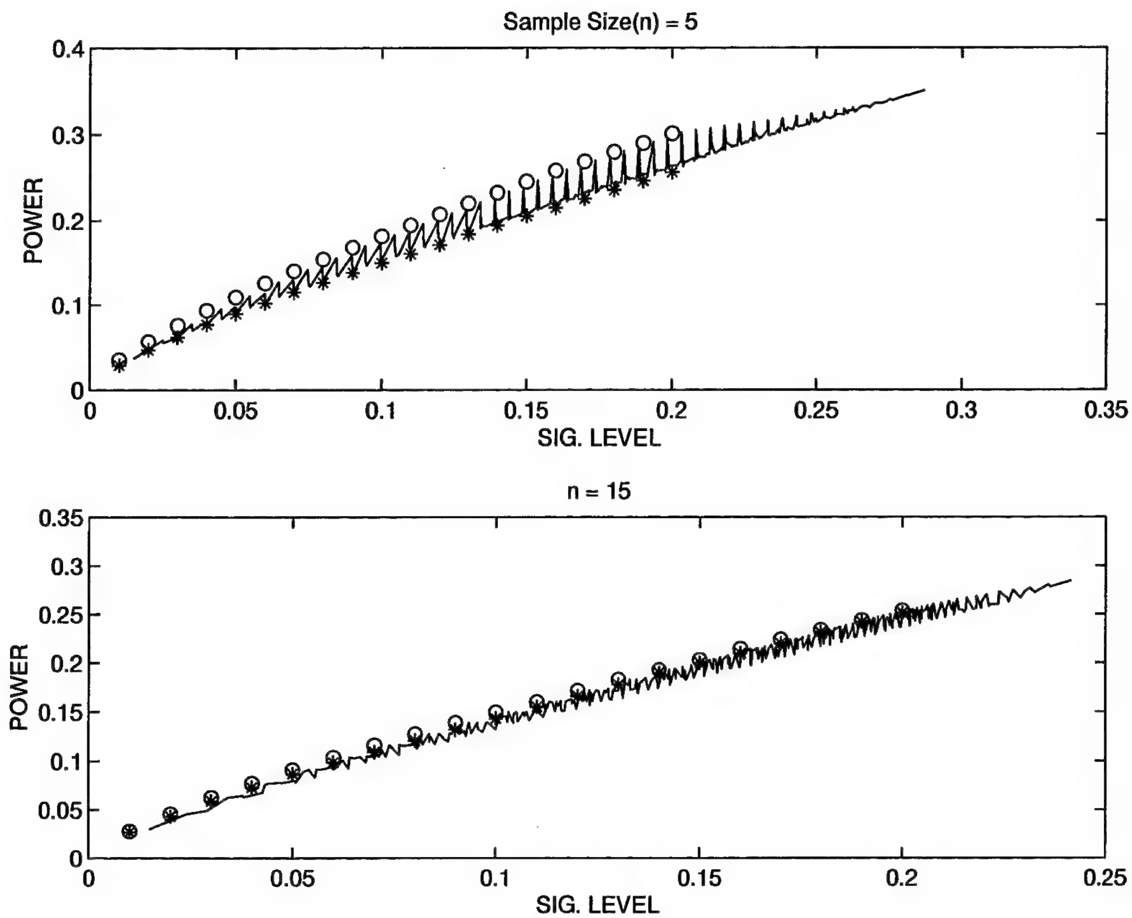


Figure F.25 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: $\chi^2(1)$

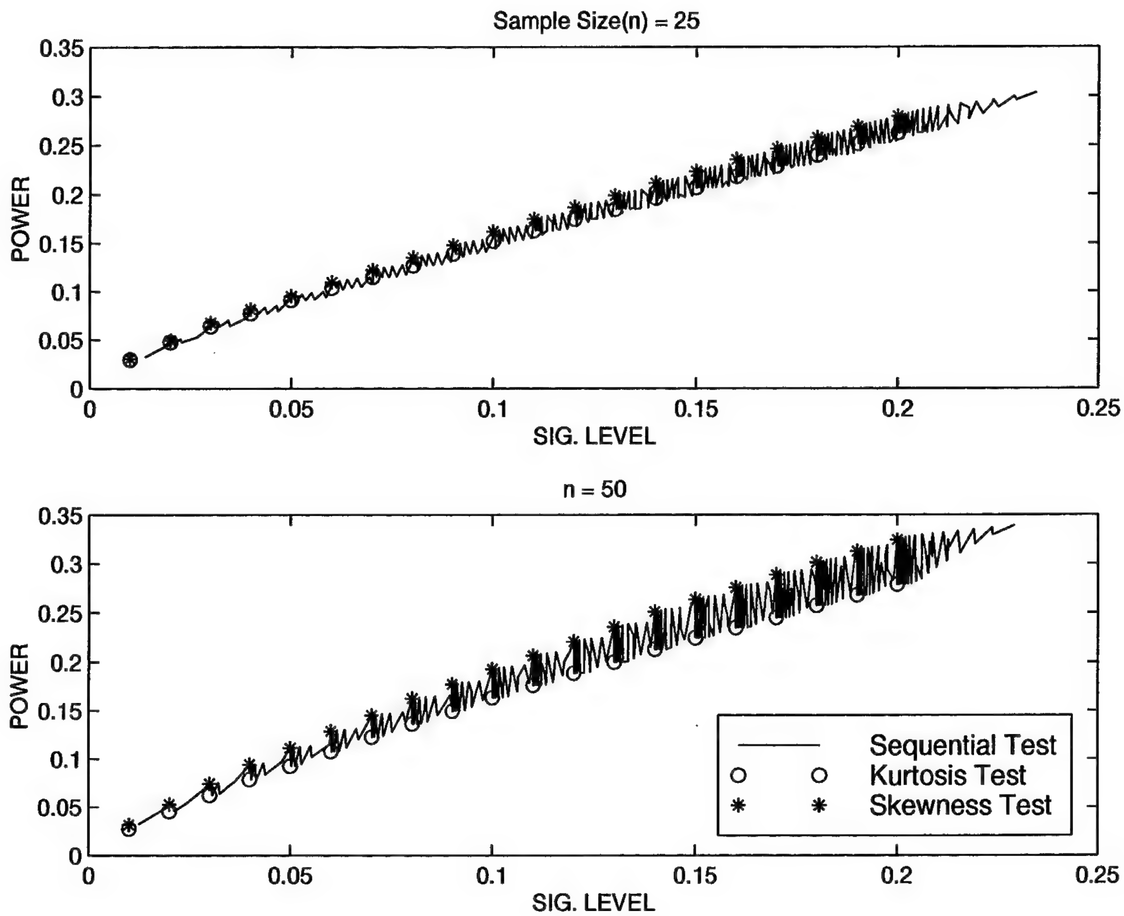


Figure F.26 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: $\chi^2(1)$

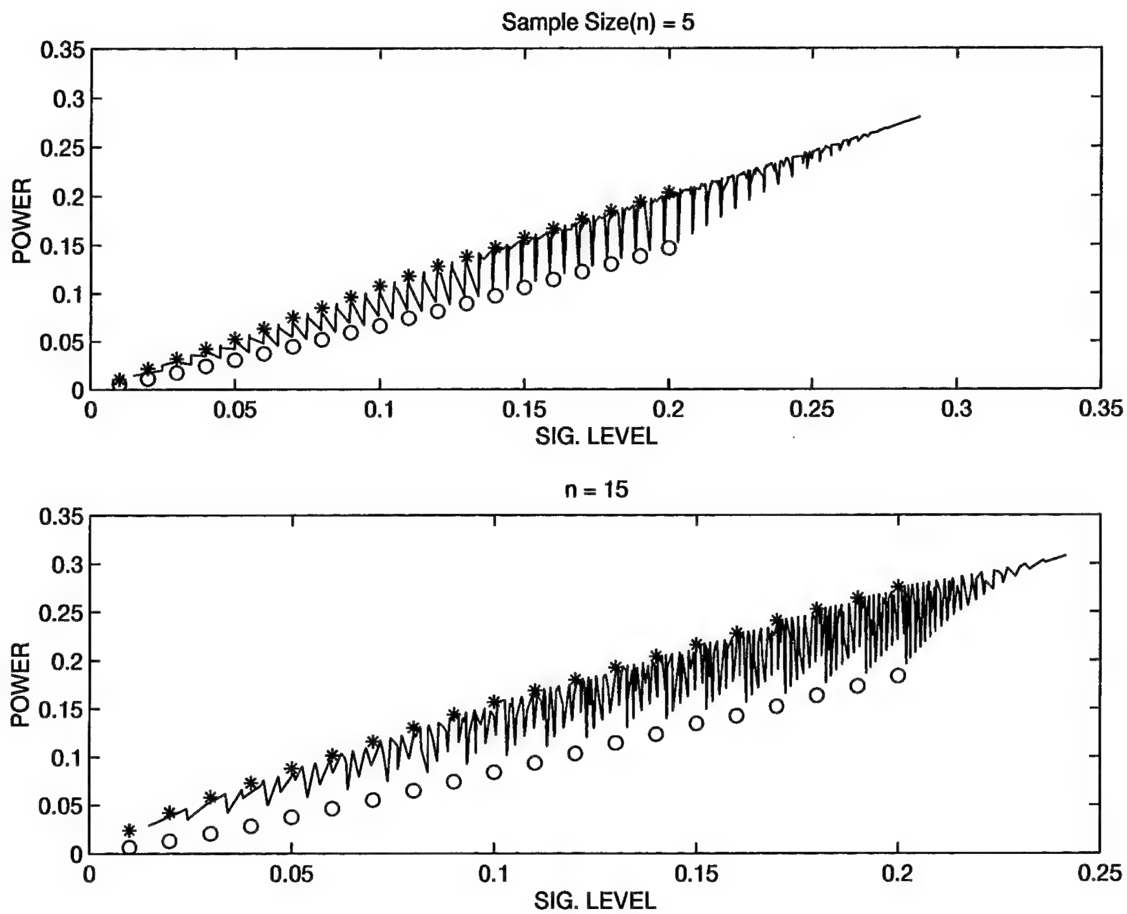


Figure F.27 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: $\chi^2(4)$

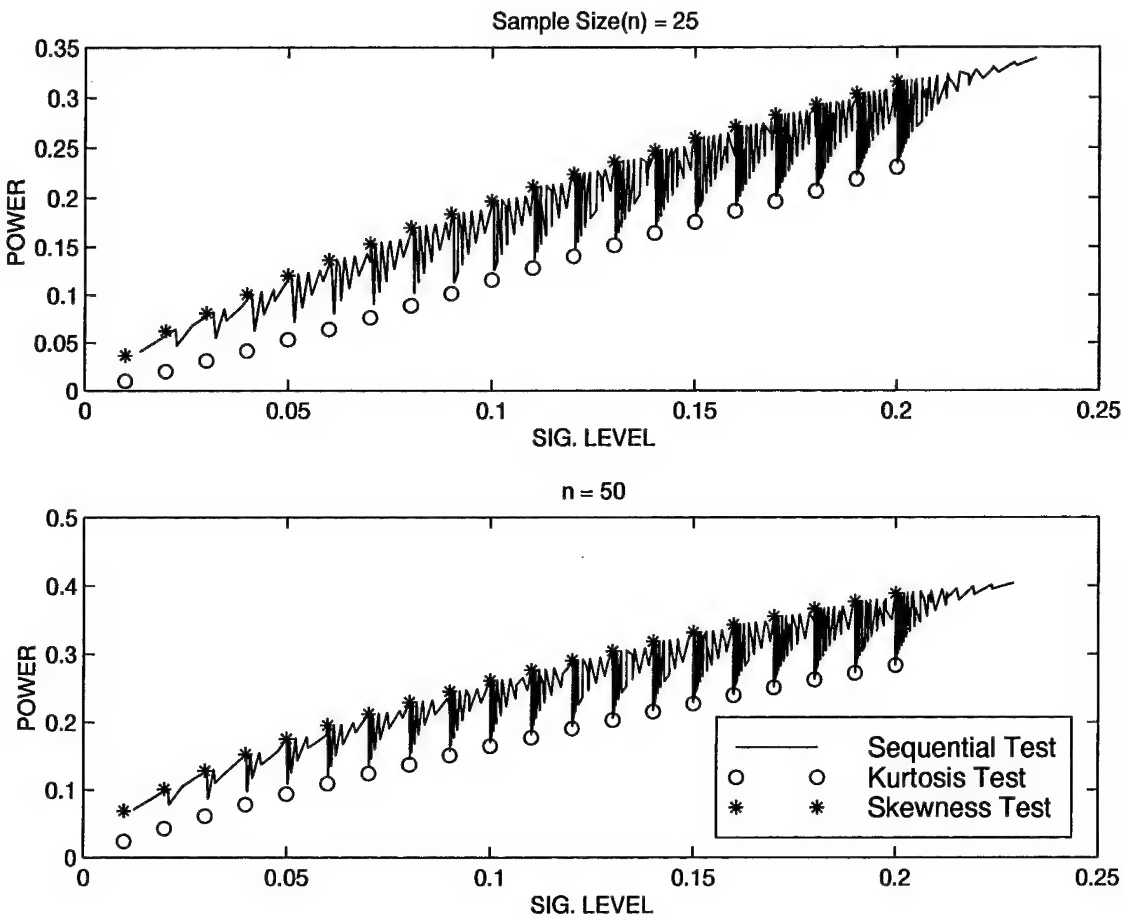


Figure F.28 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: $\chi^2(4)$

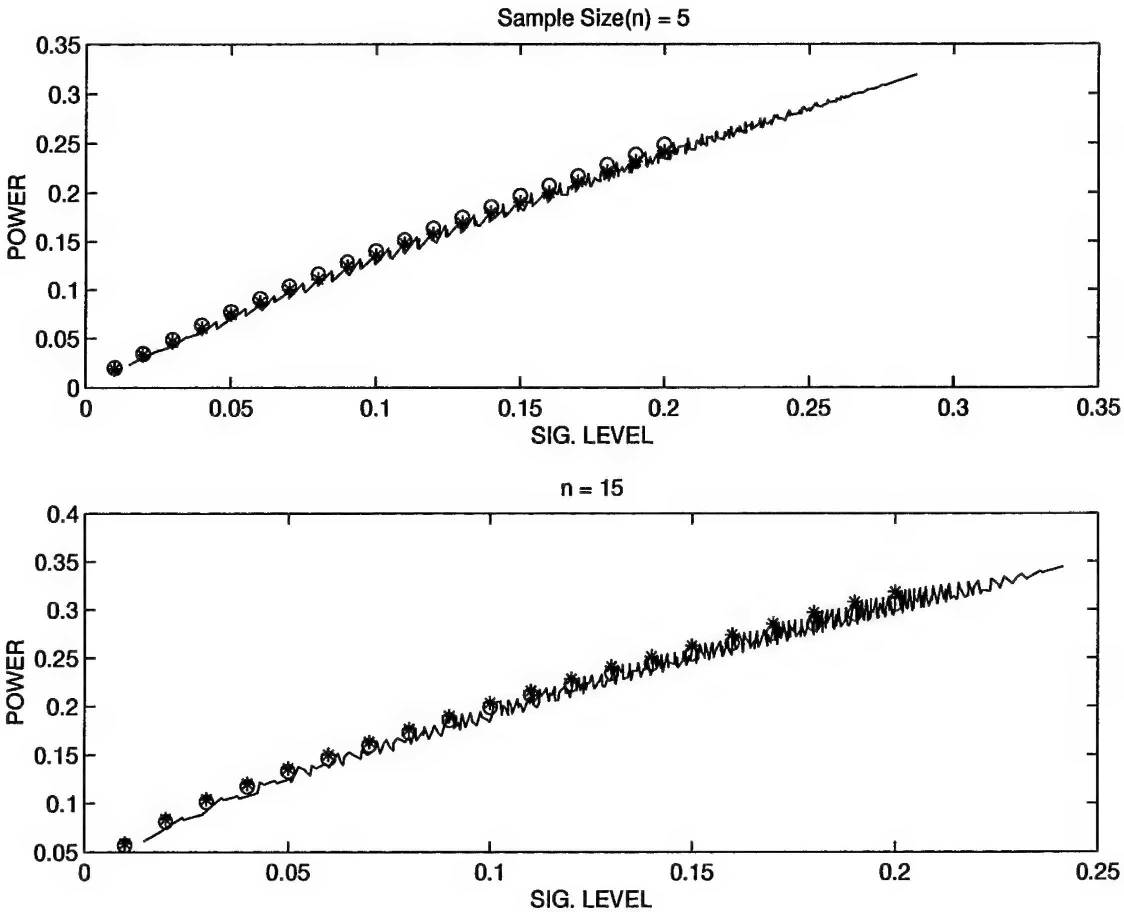


Figure F.29 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Lognormal(0,1)

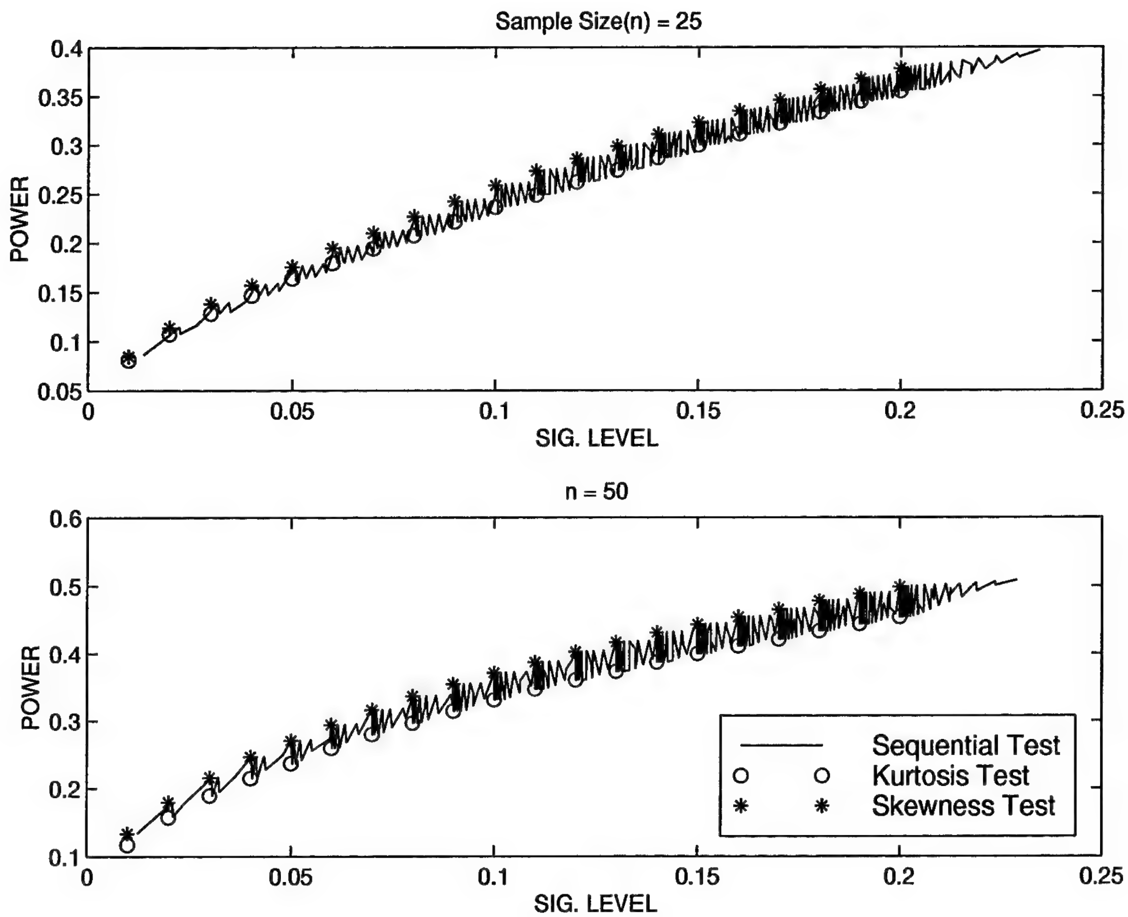


Figure F.30 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Lognormal(0,1)

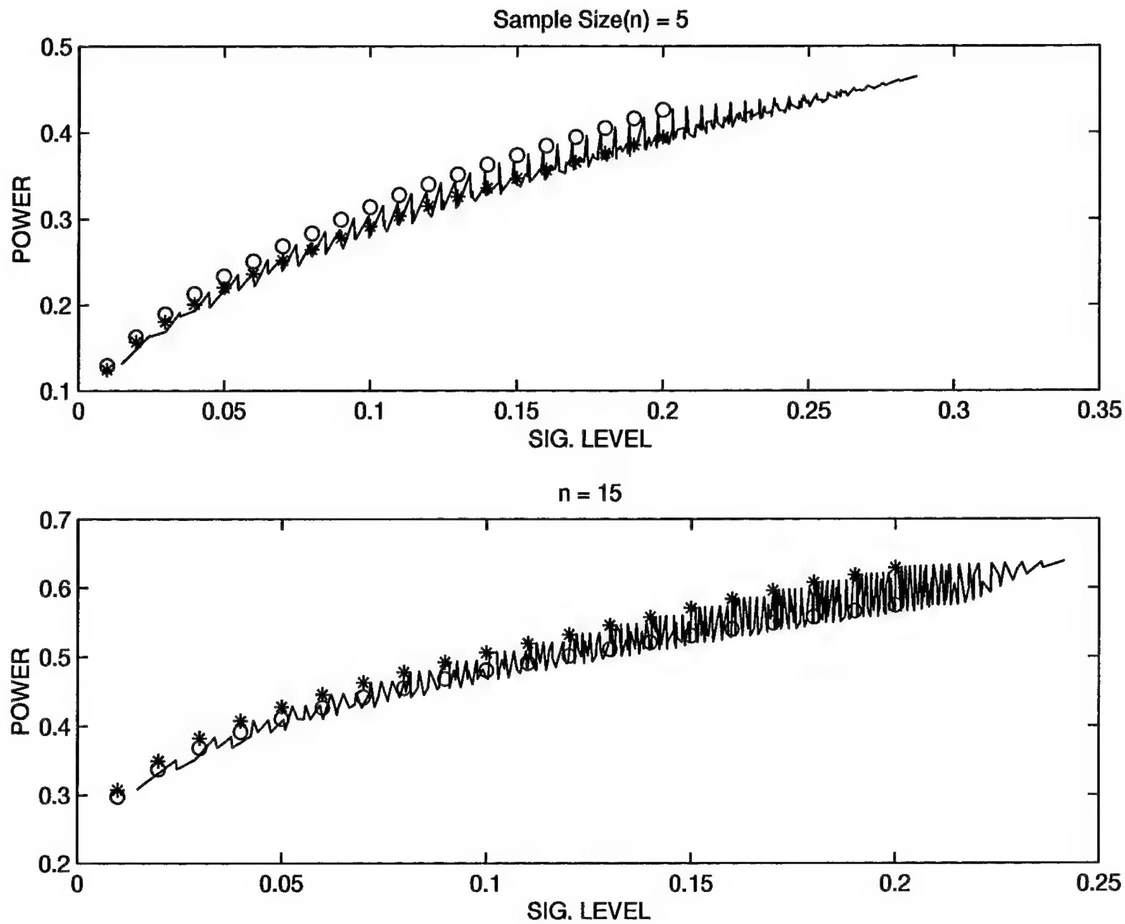


Figure F.31 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: XLogistic(0,1)

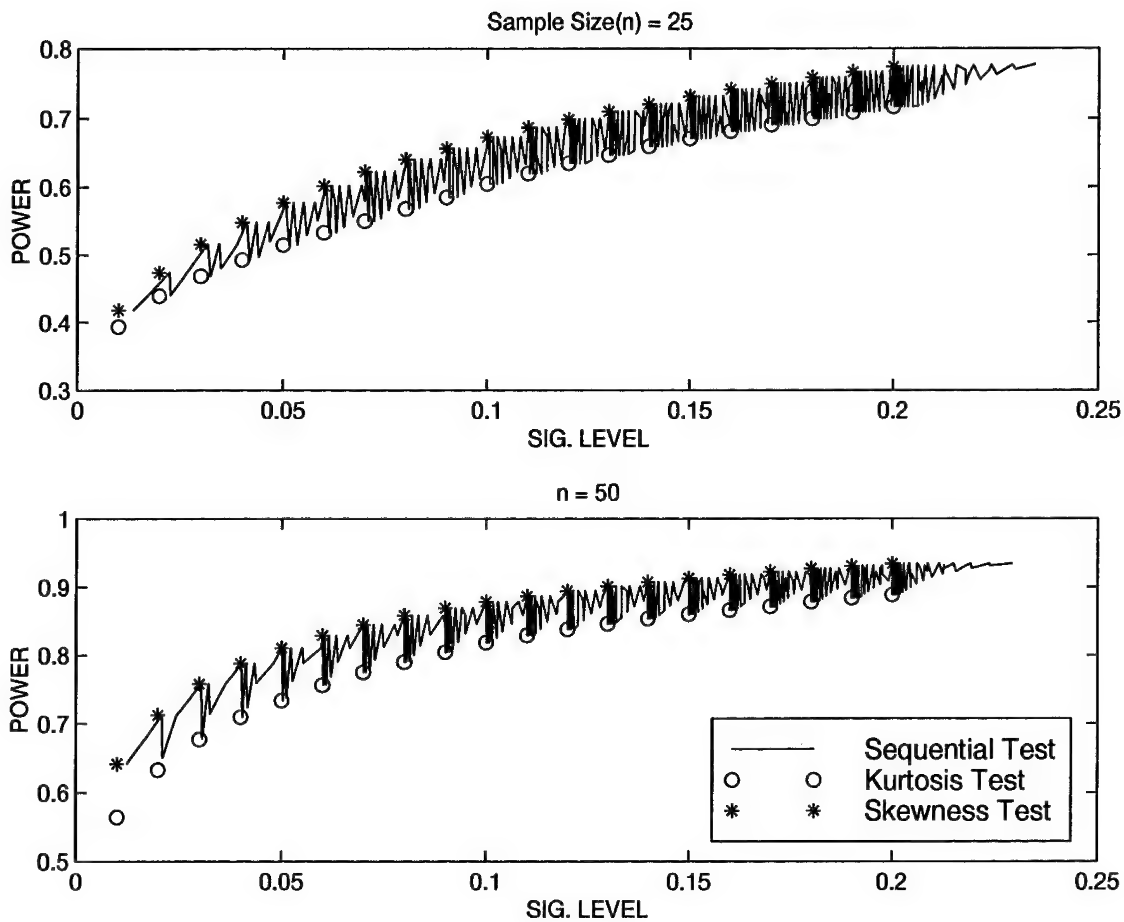


Figure F.32 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: XLogistic(0,1)

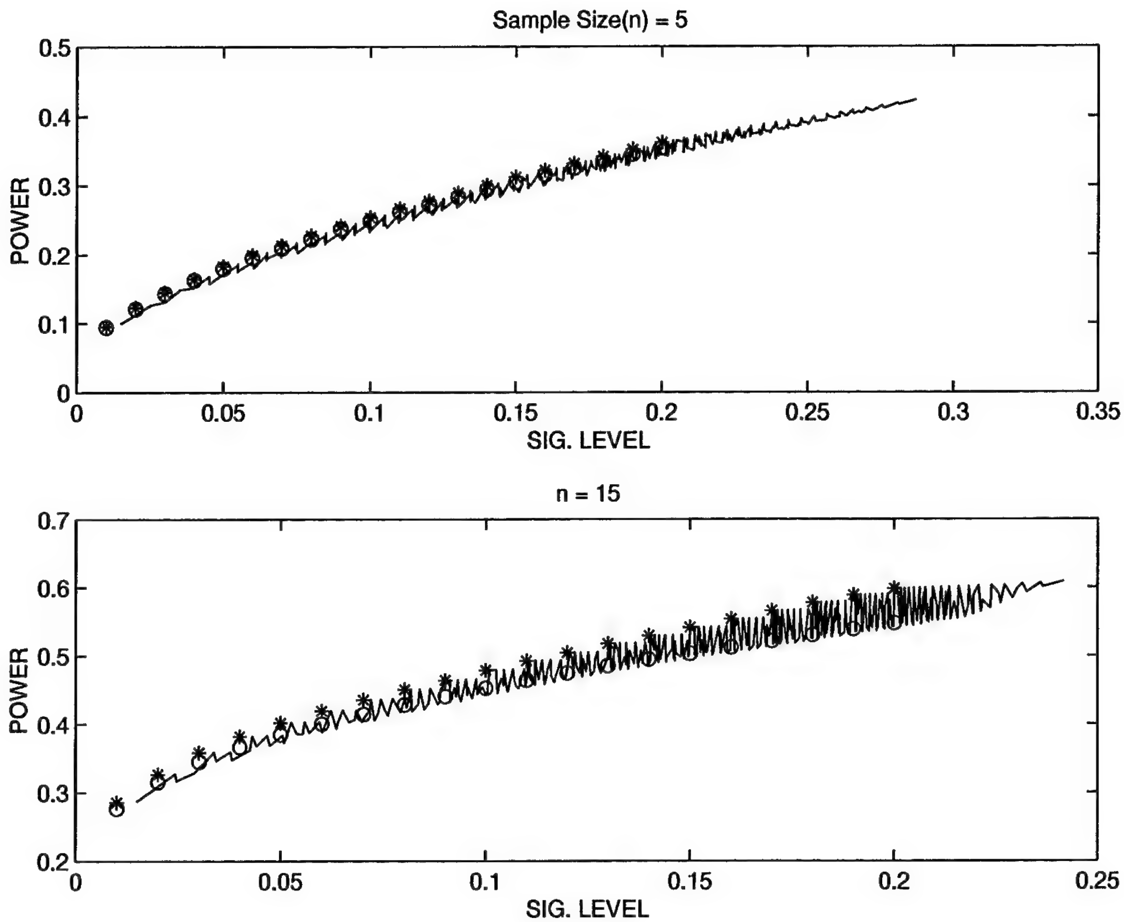


Figure F.33 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Xdouble-Exp.

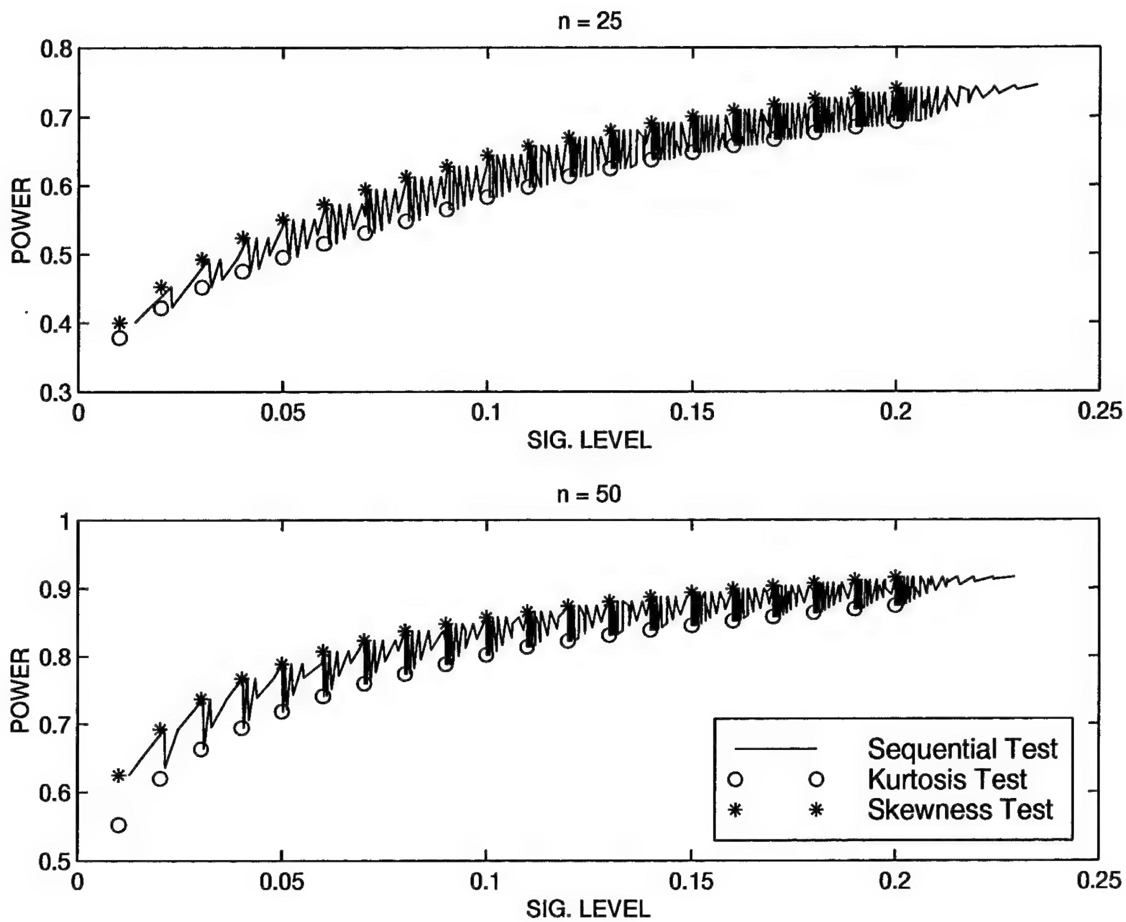


Figure F.34 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: Xdouble-Exp.

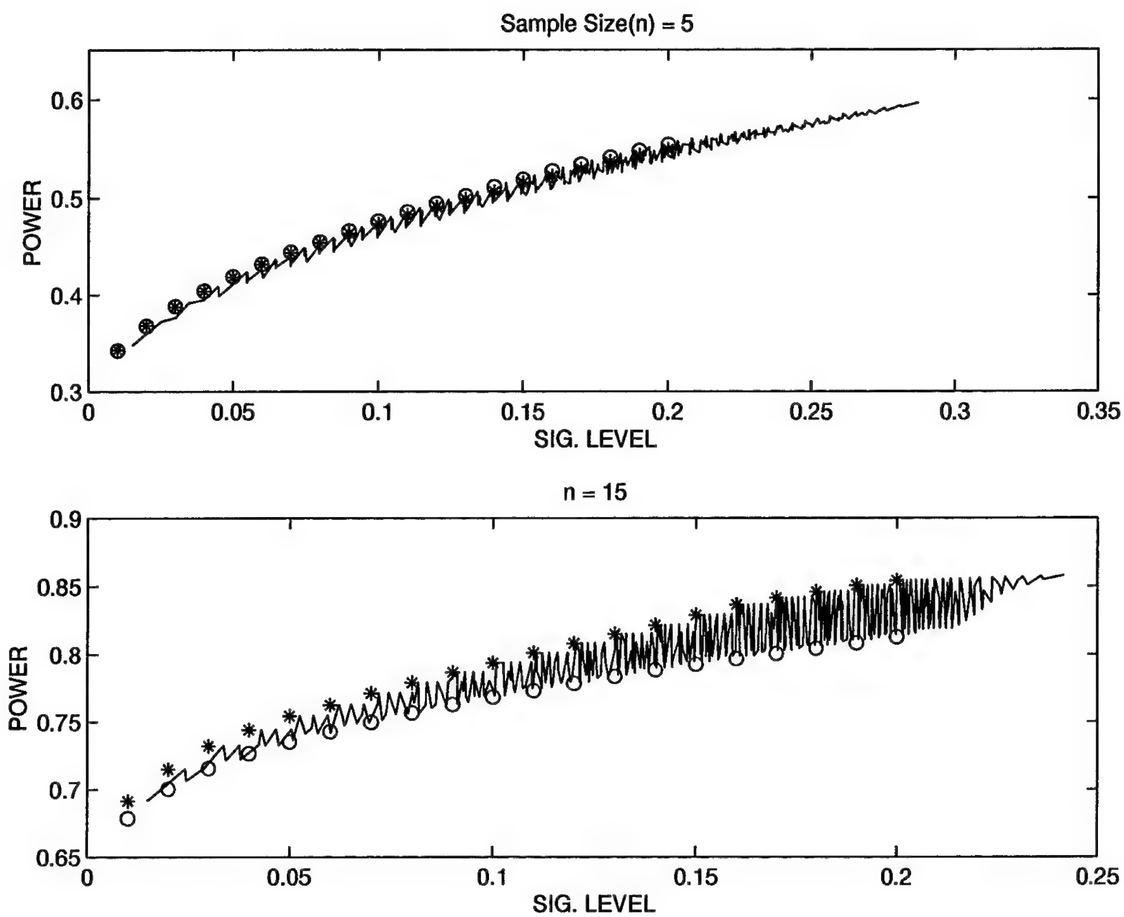


Figure F.35 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: XCauchy(0,1)

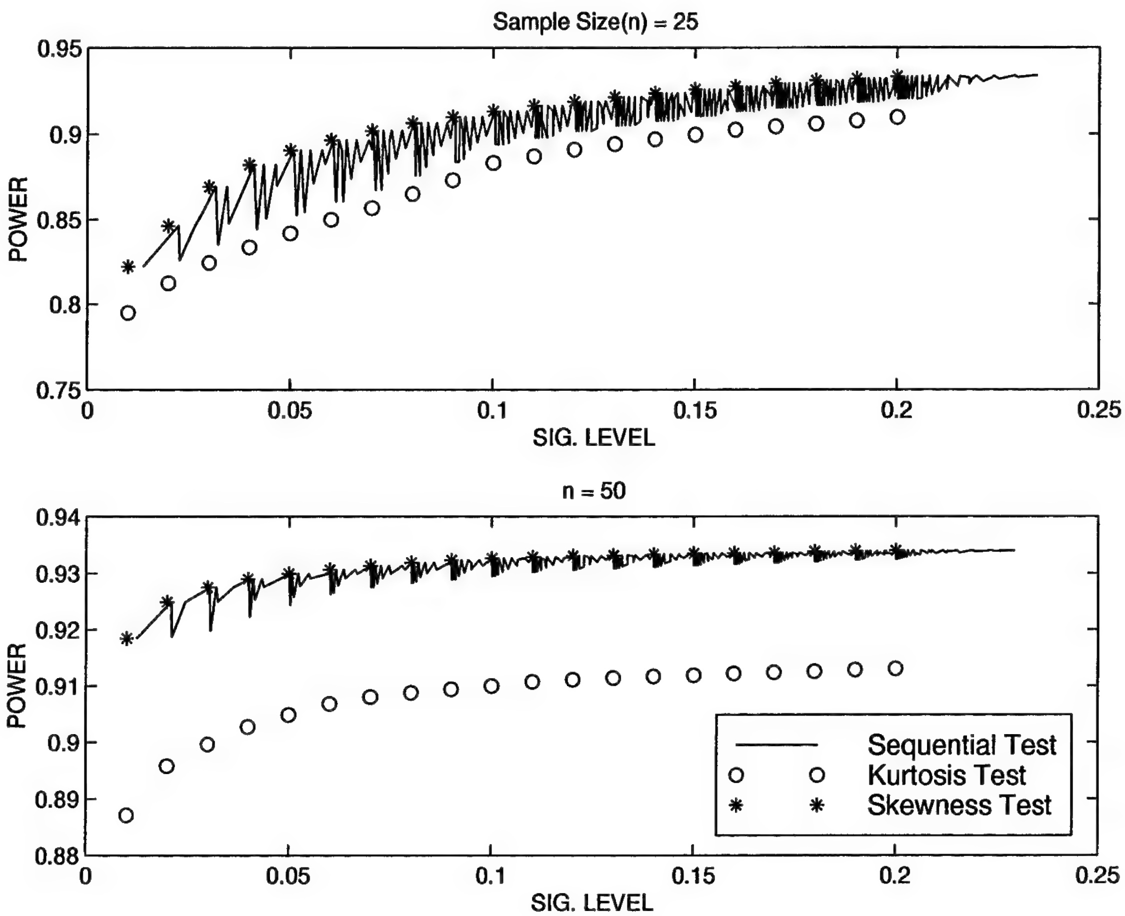


Figure F.36 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); H_a: XCauchy(0,1)

F.3 H_0: *Gamma* (β = *1.5*)

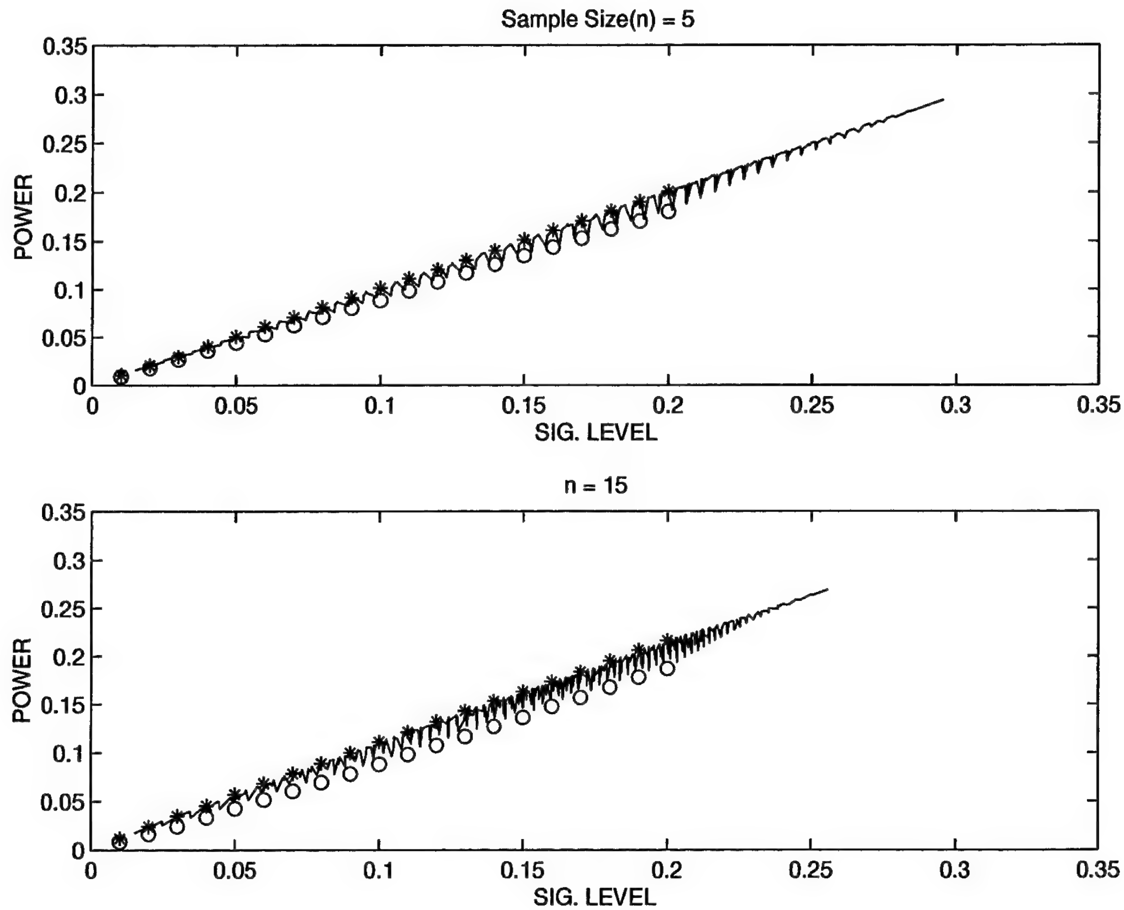


Figure F.37 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1.5,1); H_a : $\chi^2(4)$

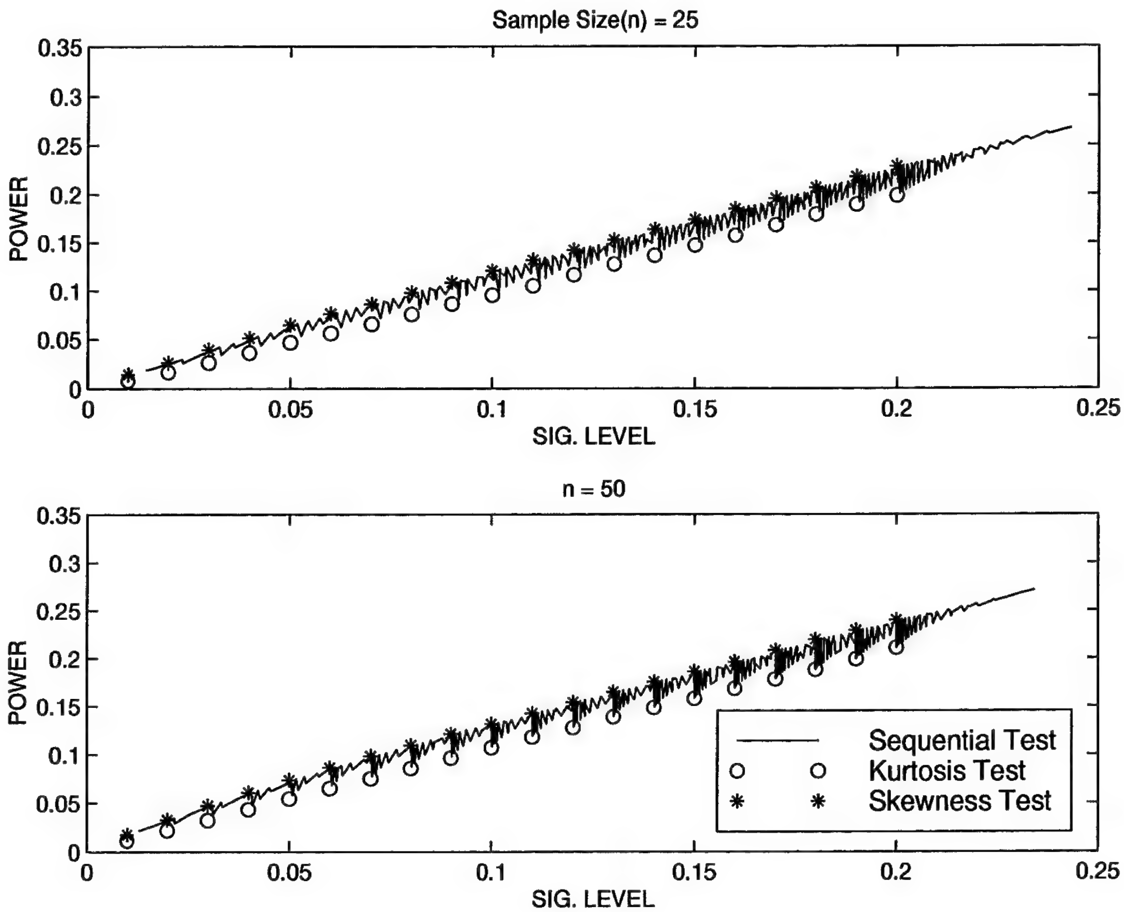


Figure F.38 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(1,1); $H_a : \chi^2(4)$

F.4 H_0: Gamma ($\beta = 3.5$)

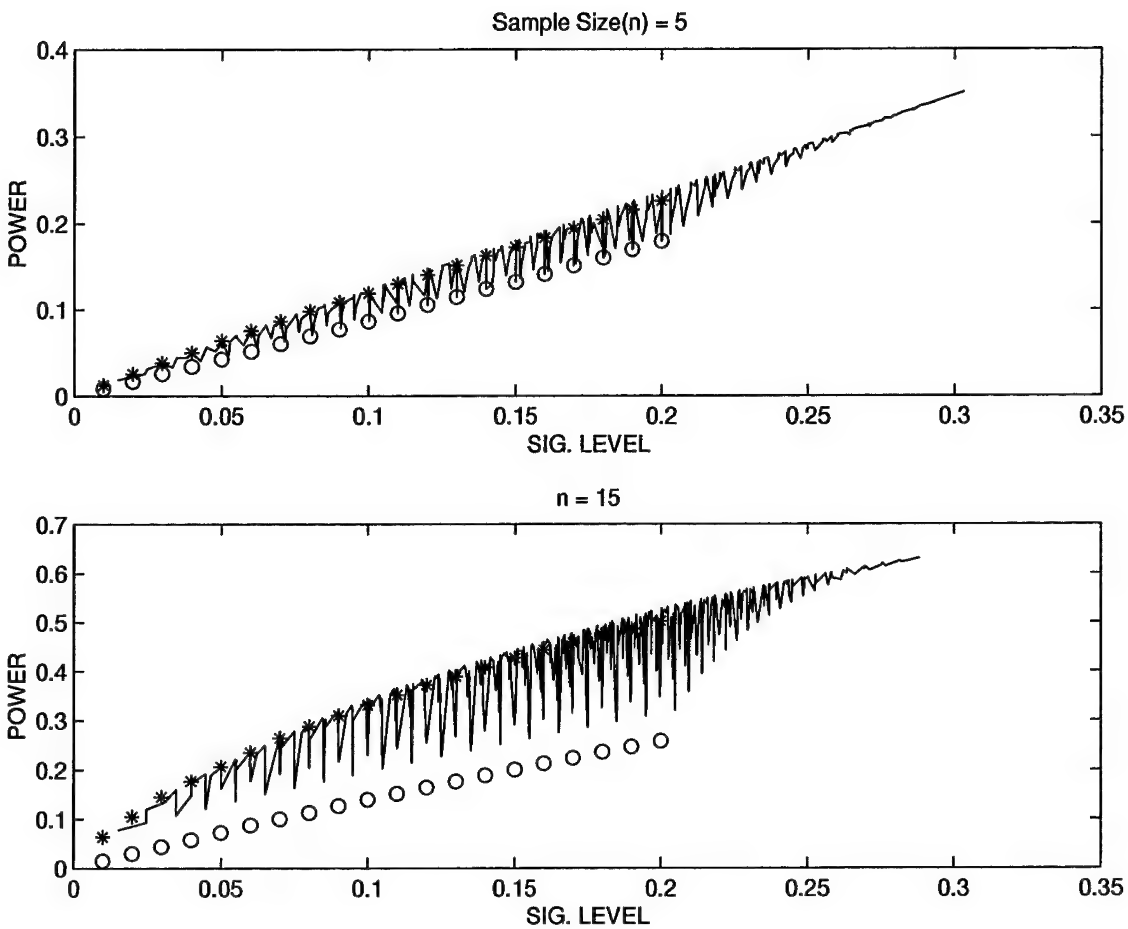


Figure F.39 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Beta(2,2)

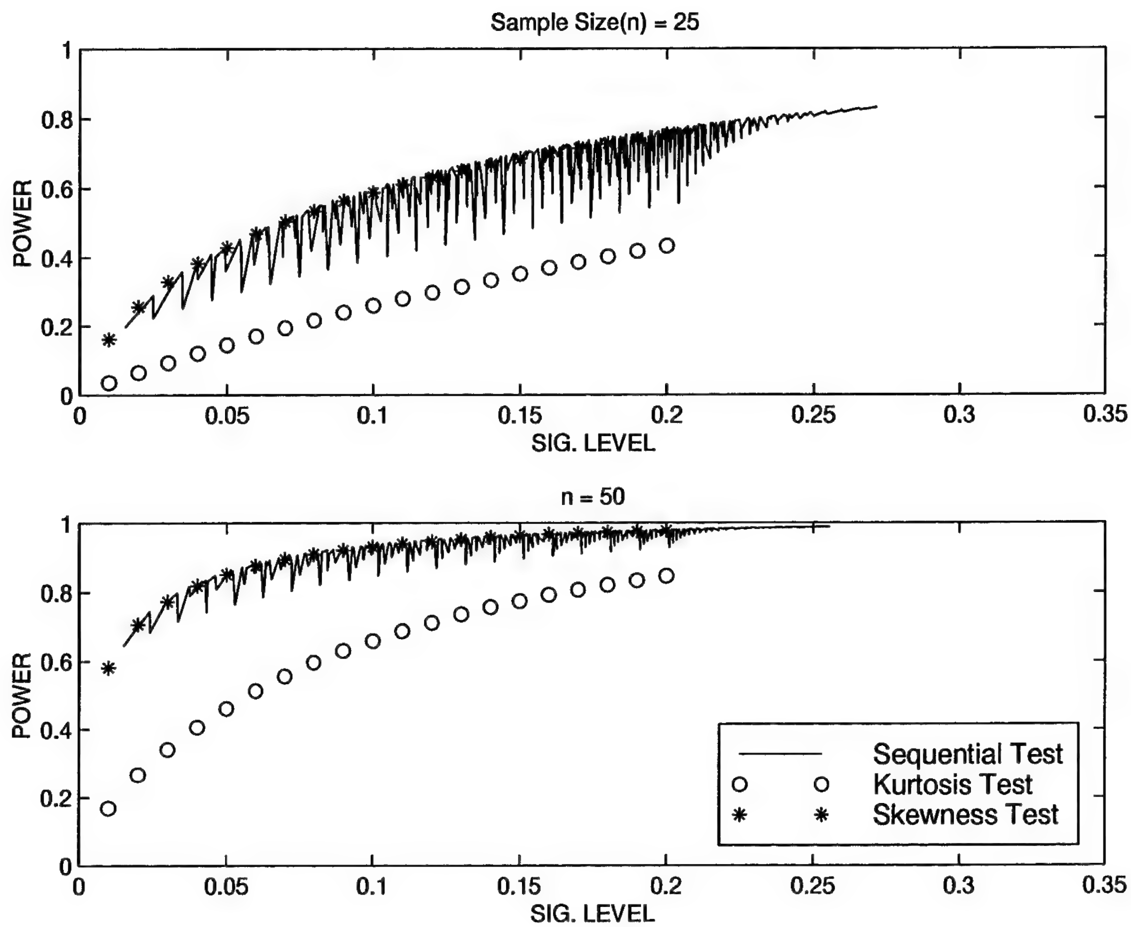


Figure F.40 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Beta(2,2)

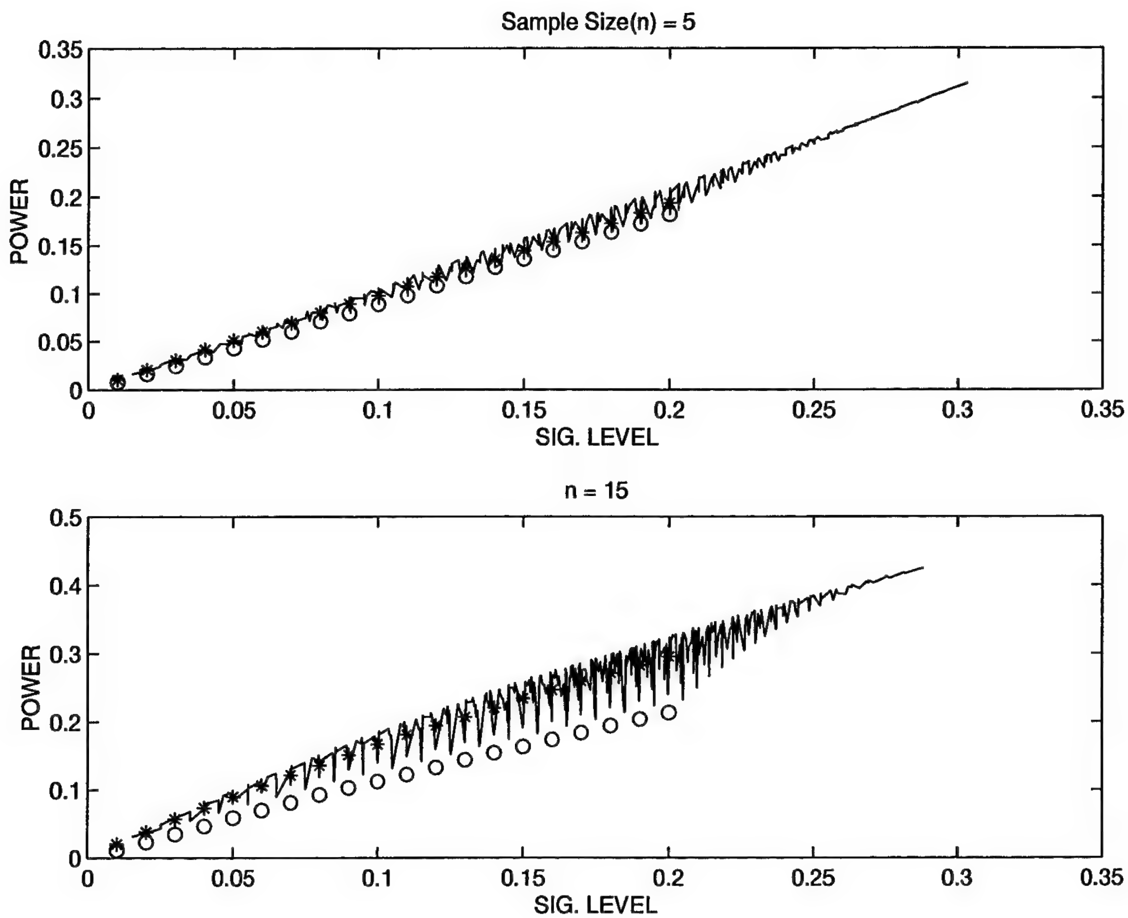


Figure F.41 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Beta(2,3)

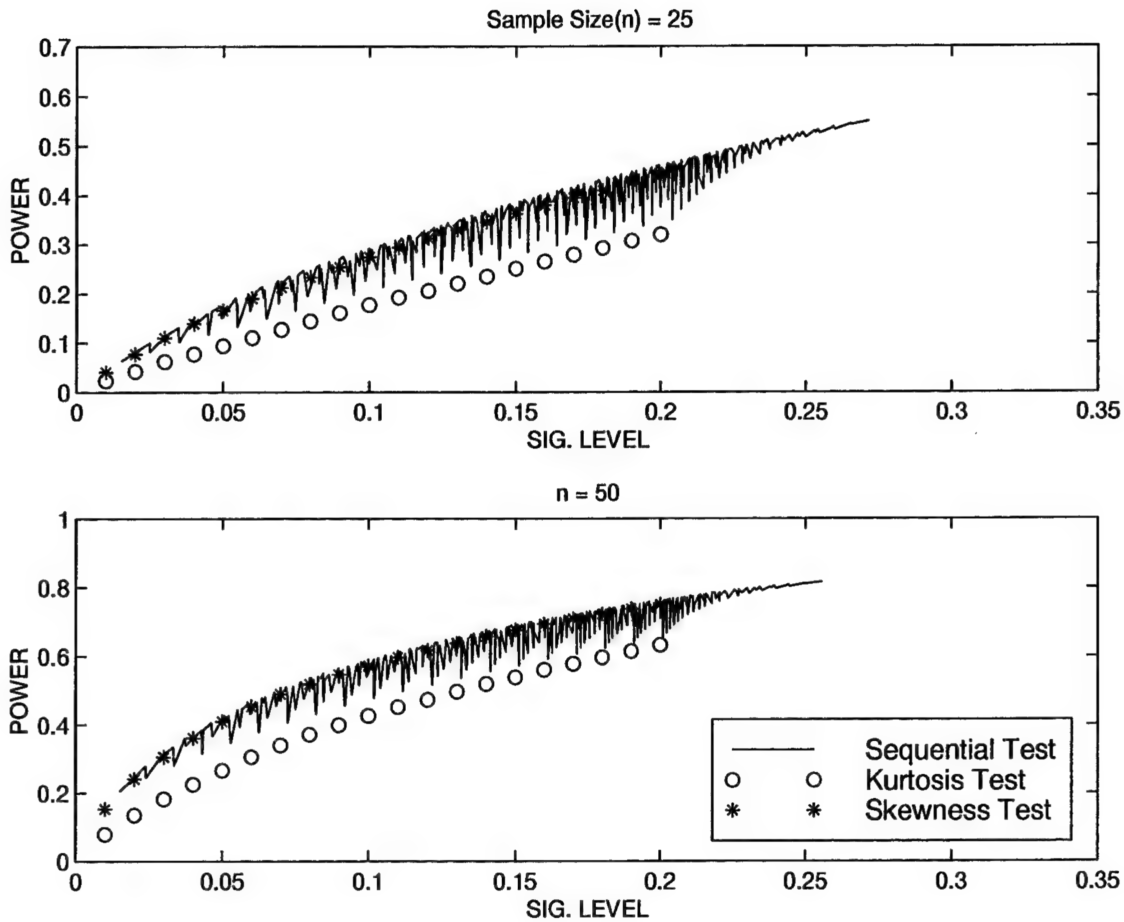


Figure F.42 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Beta(2,3)

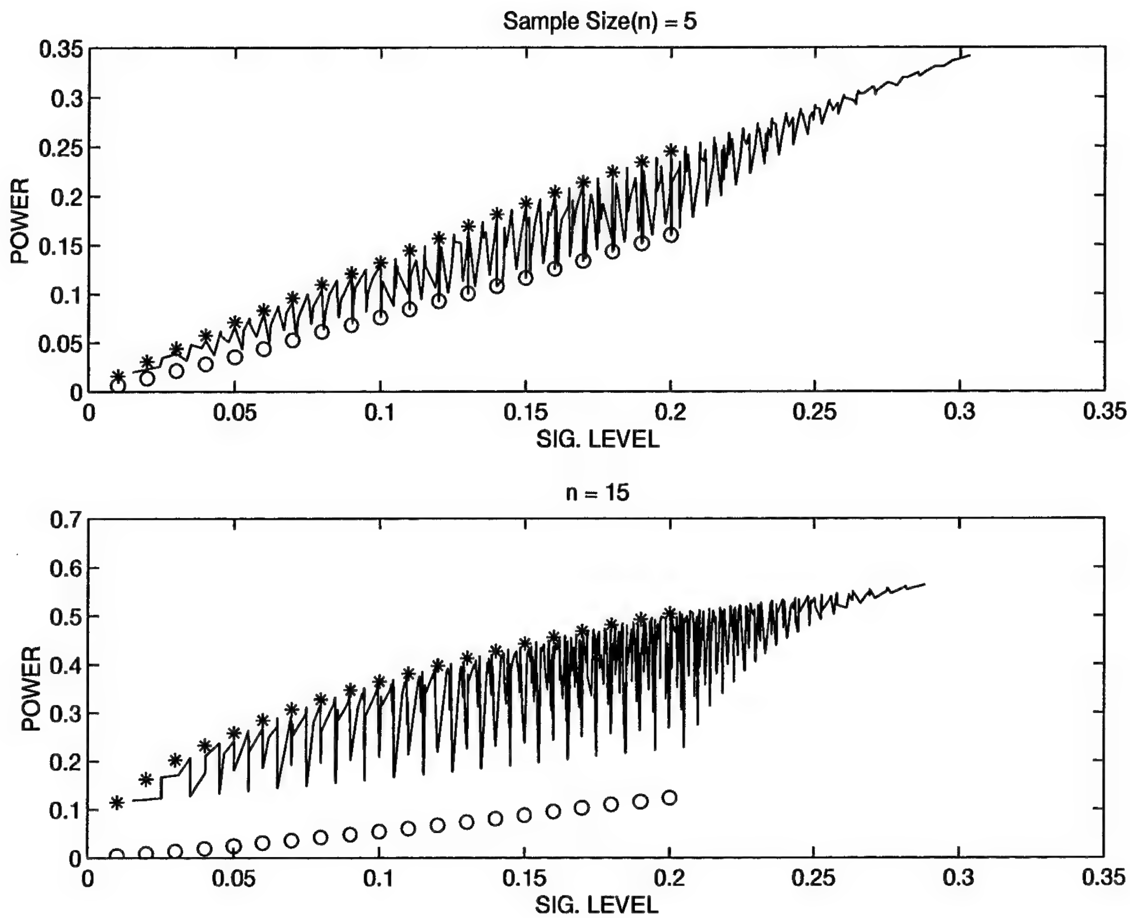


Figure F.43 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Normal(0,1)

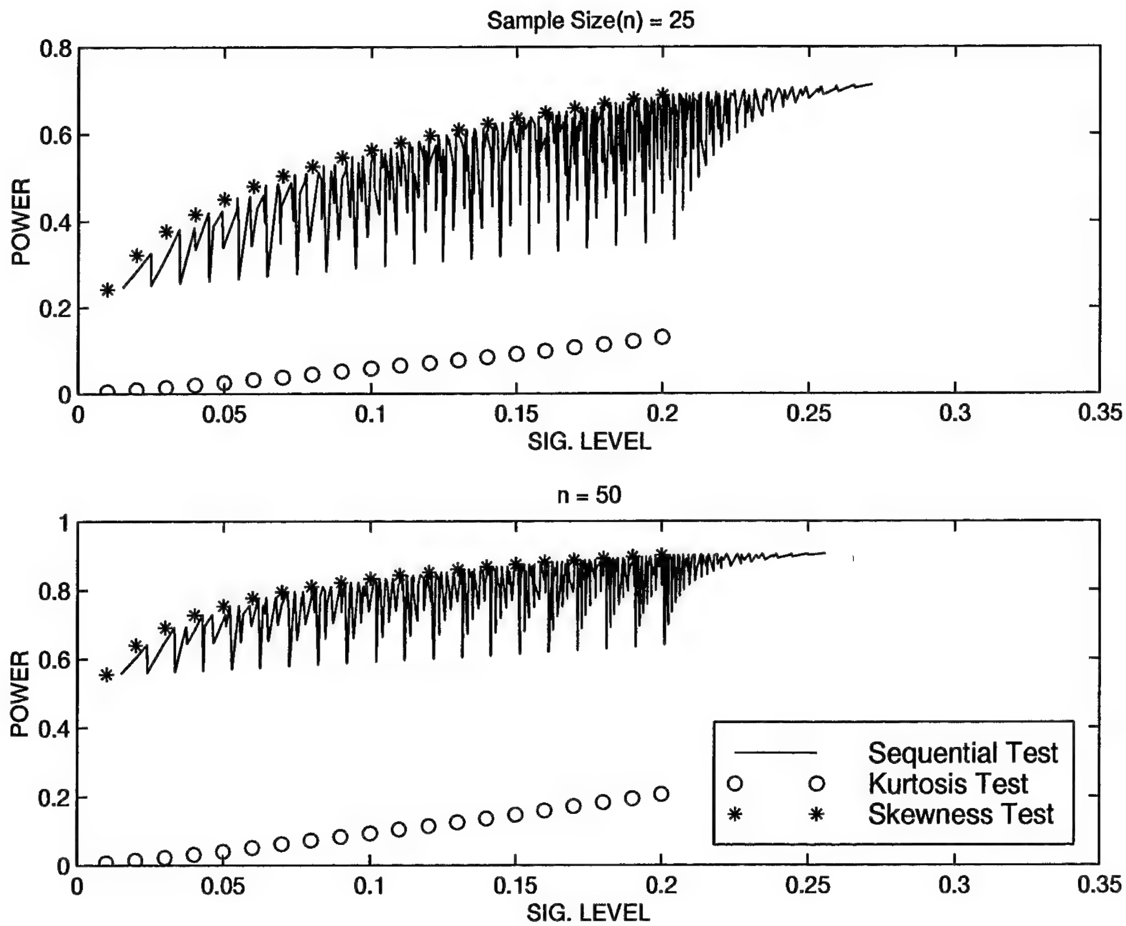


Figure F.44 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Normal(0,1)

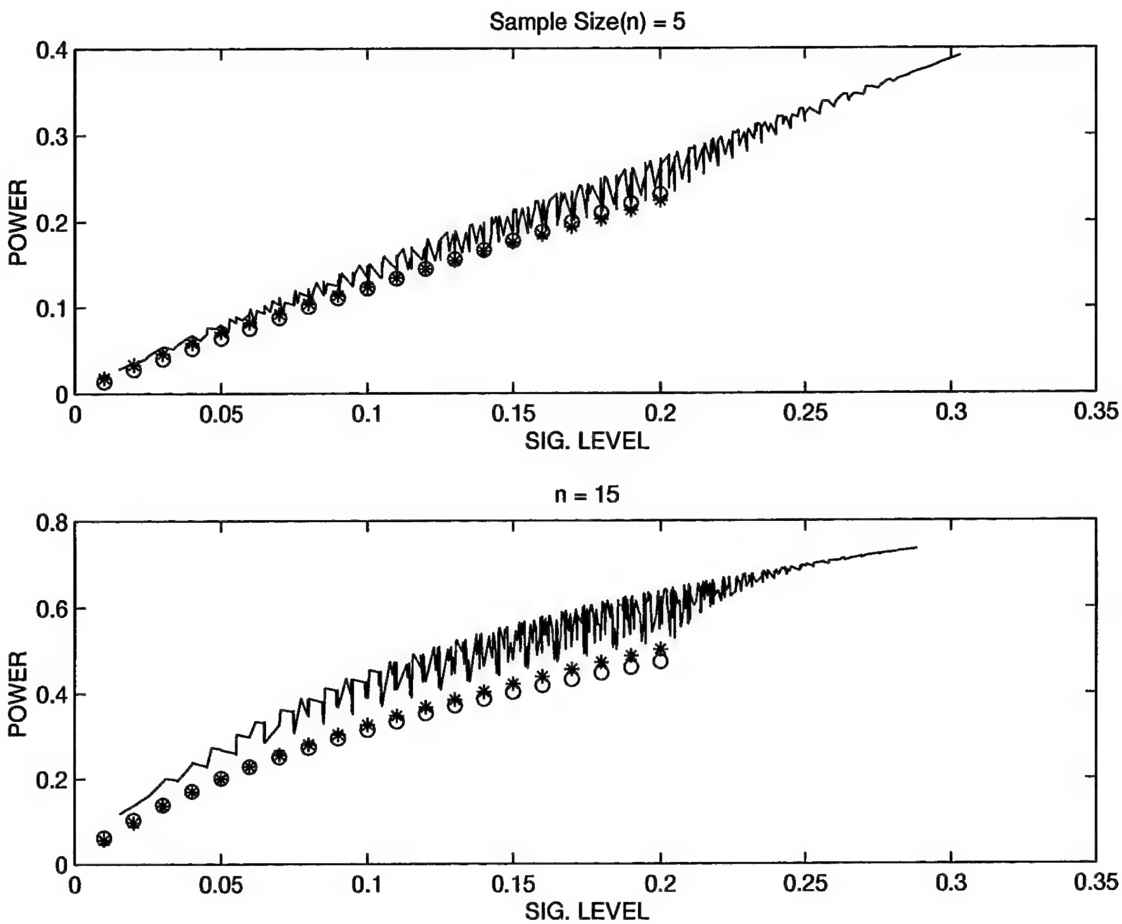


Figure F.45 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Uniform(0,2)

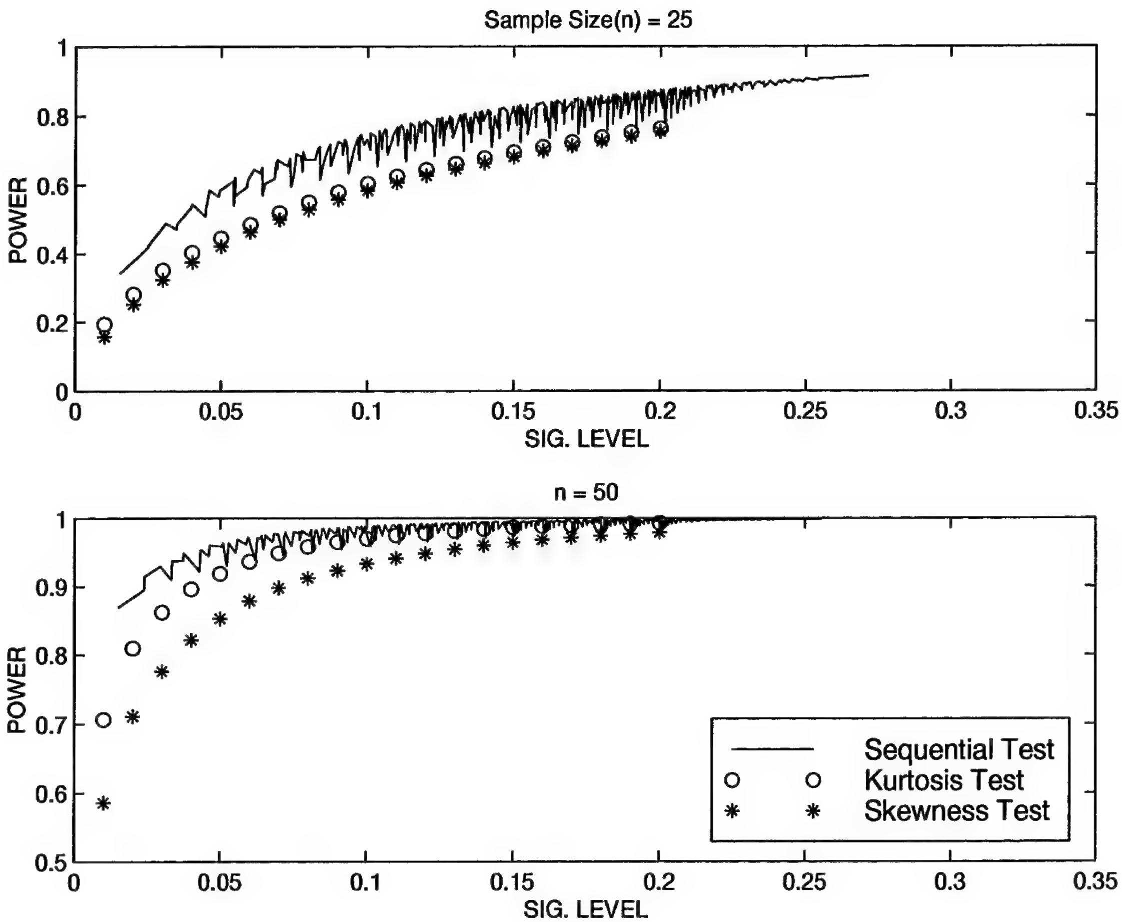


Figure F.46 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Uniform(0,2)

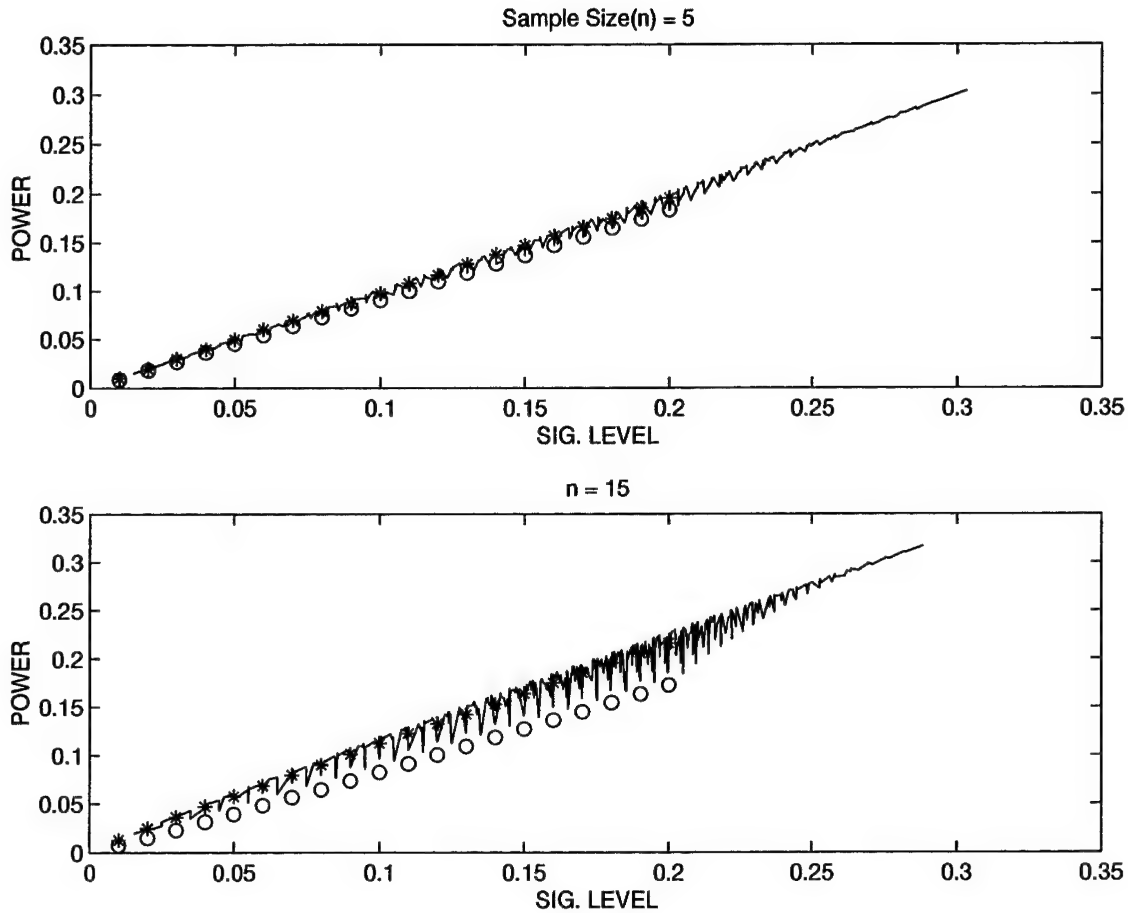


Figure F.47 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Weibull(2,1)

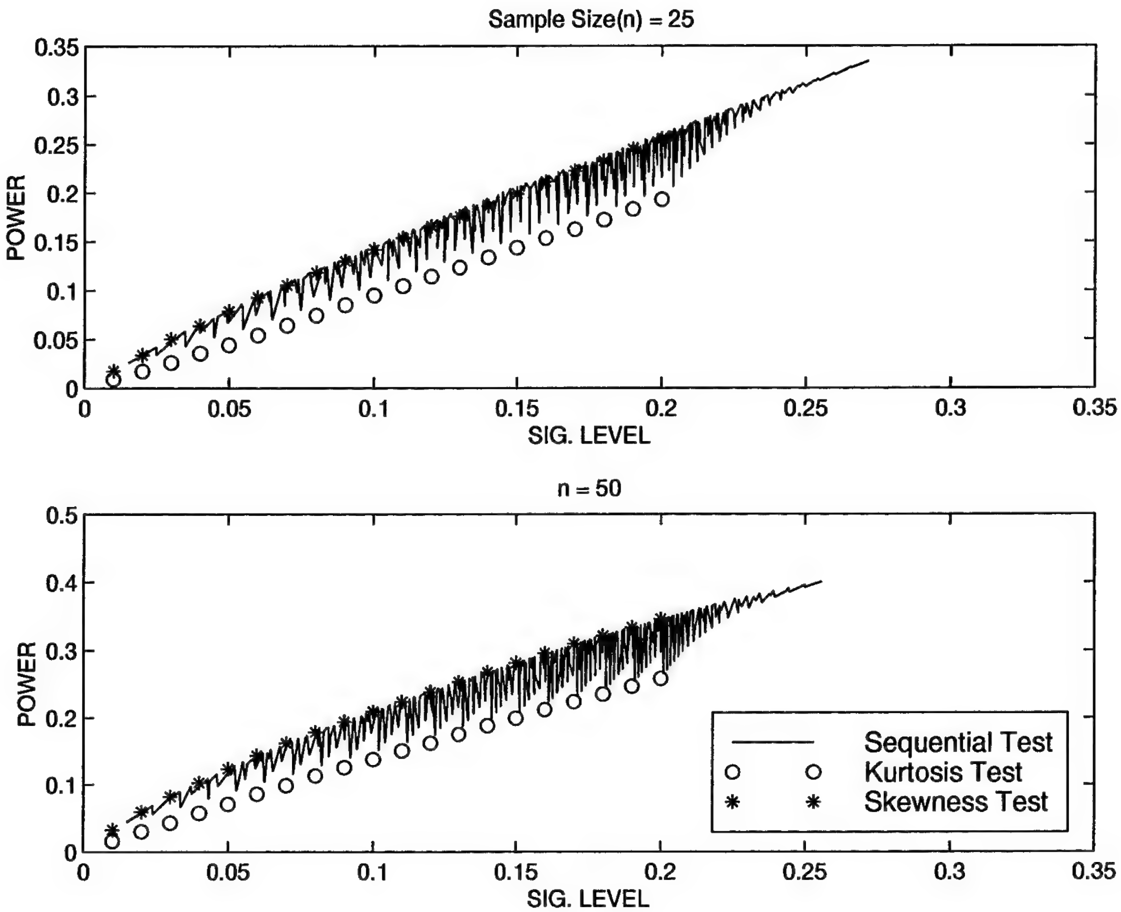


Figure F.48 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Weibull(2,1)

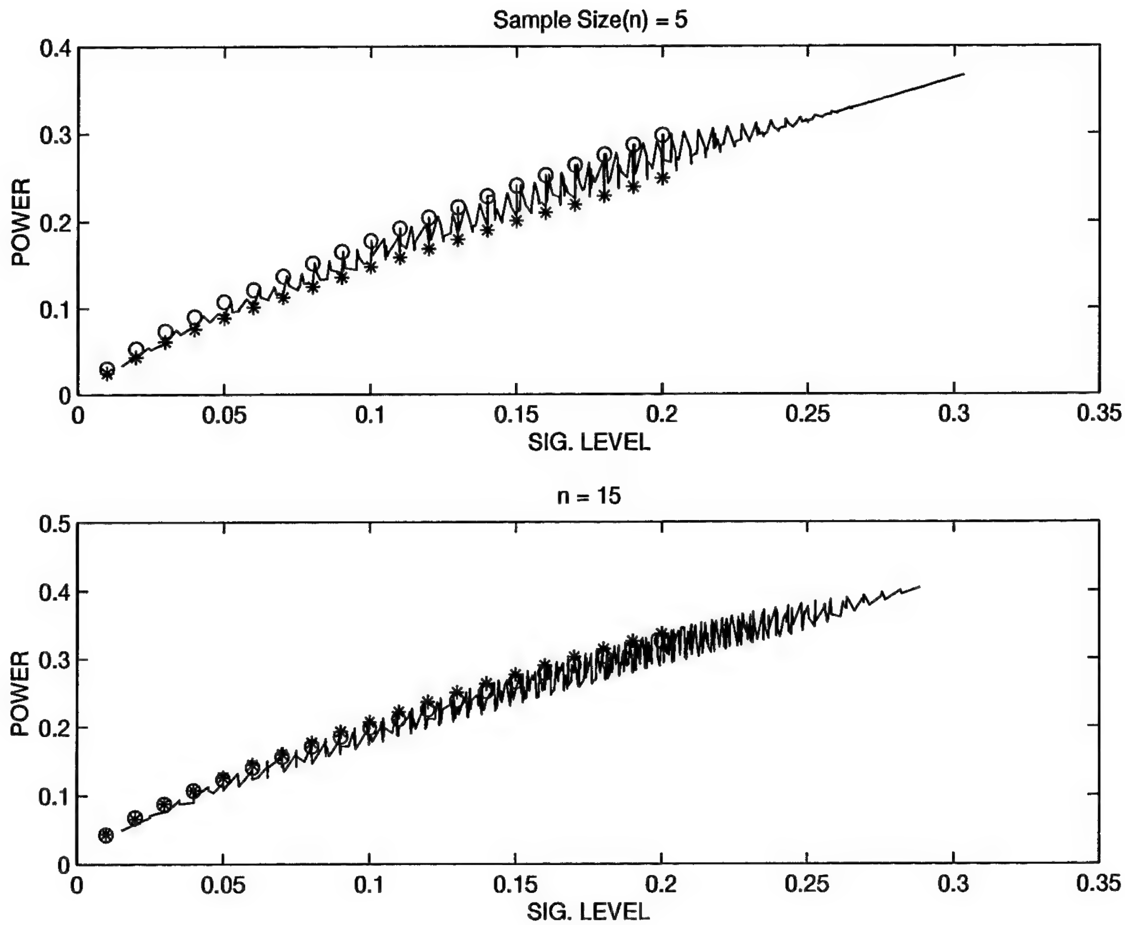


Figure F.49 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Gamma(1,1)

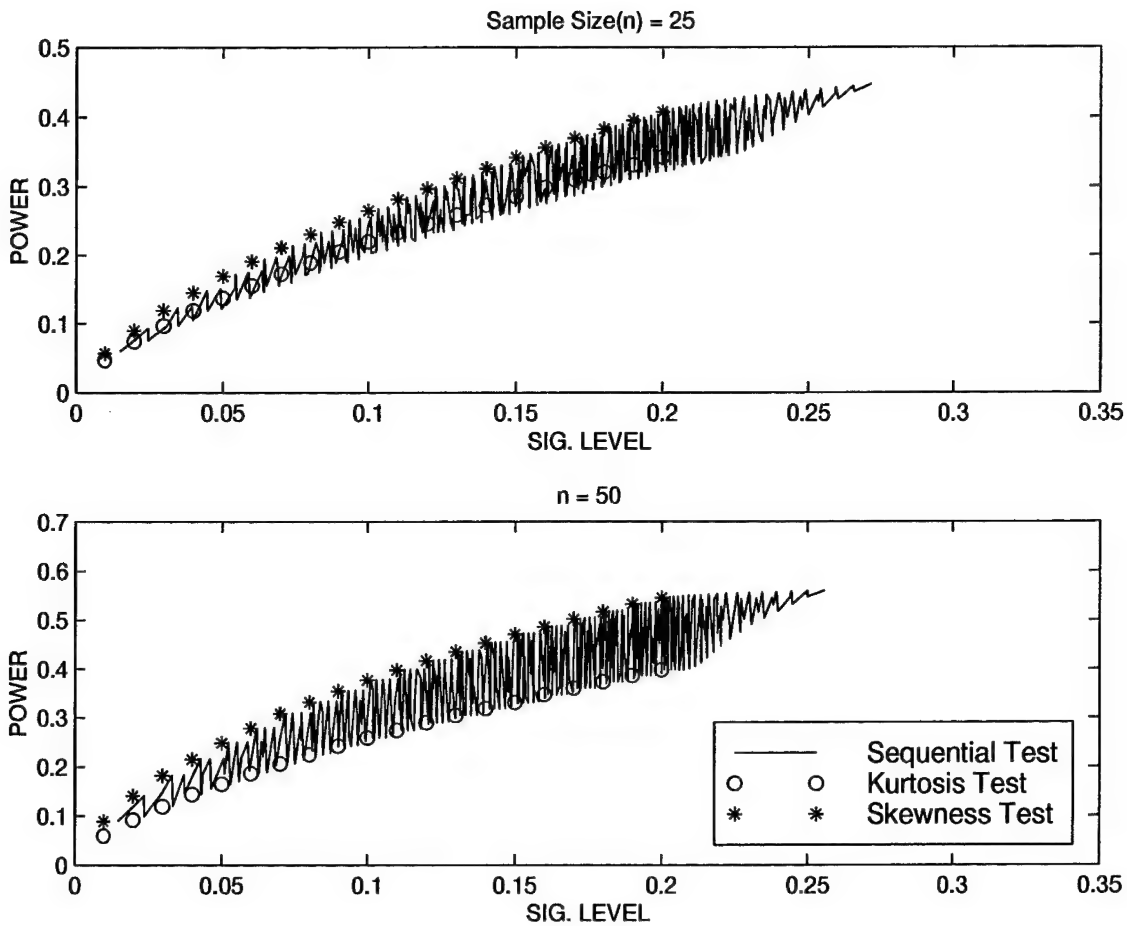


Figure F.50 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Gamma(1,1)

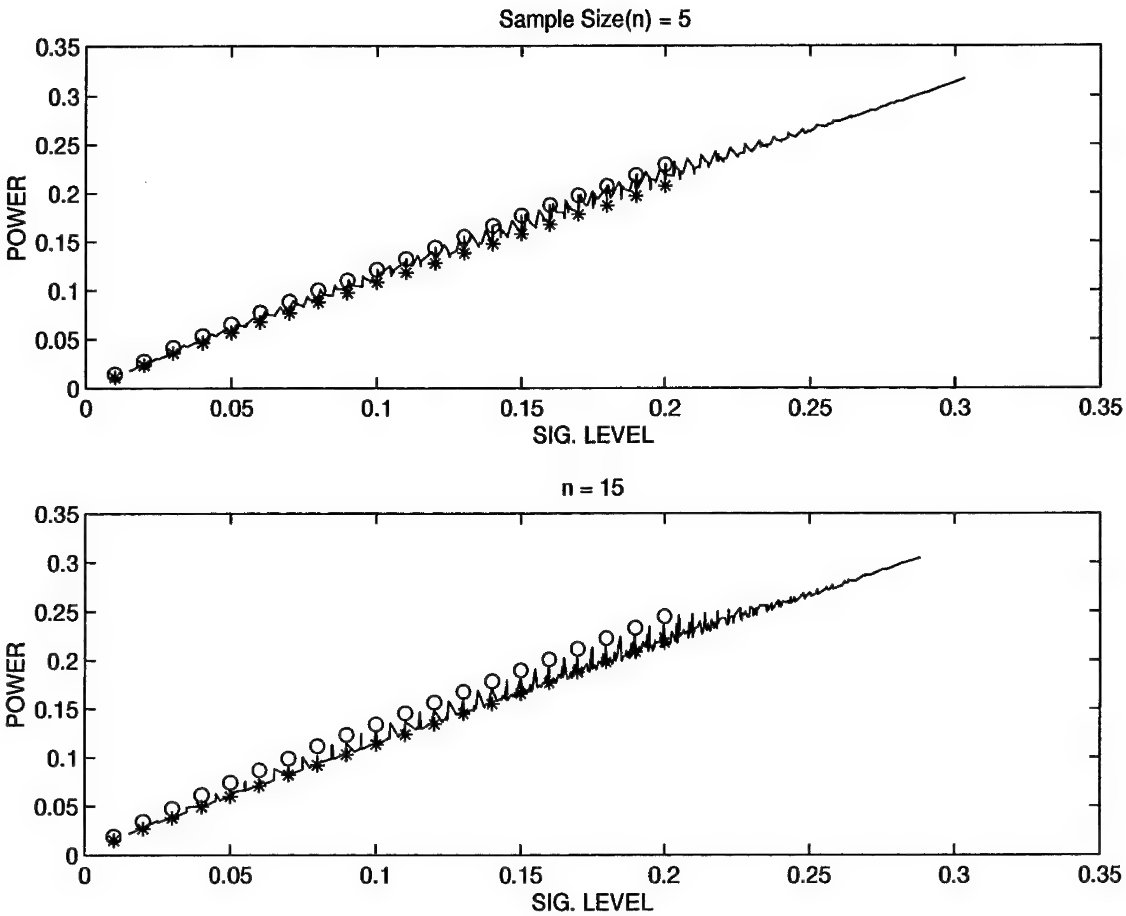


Figure F.51 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Gamma(2,1)

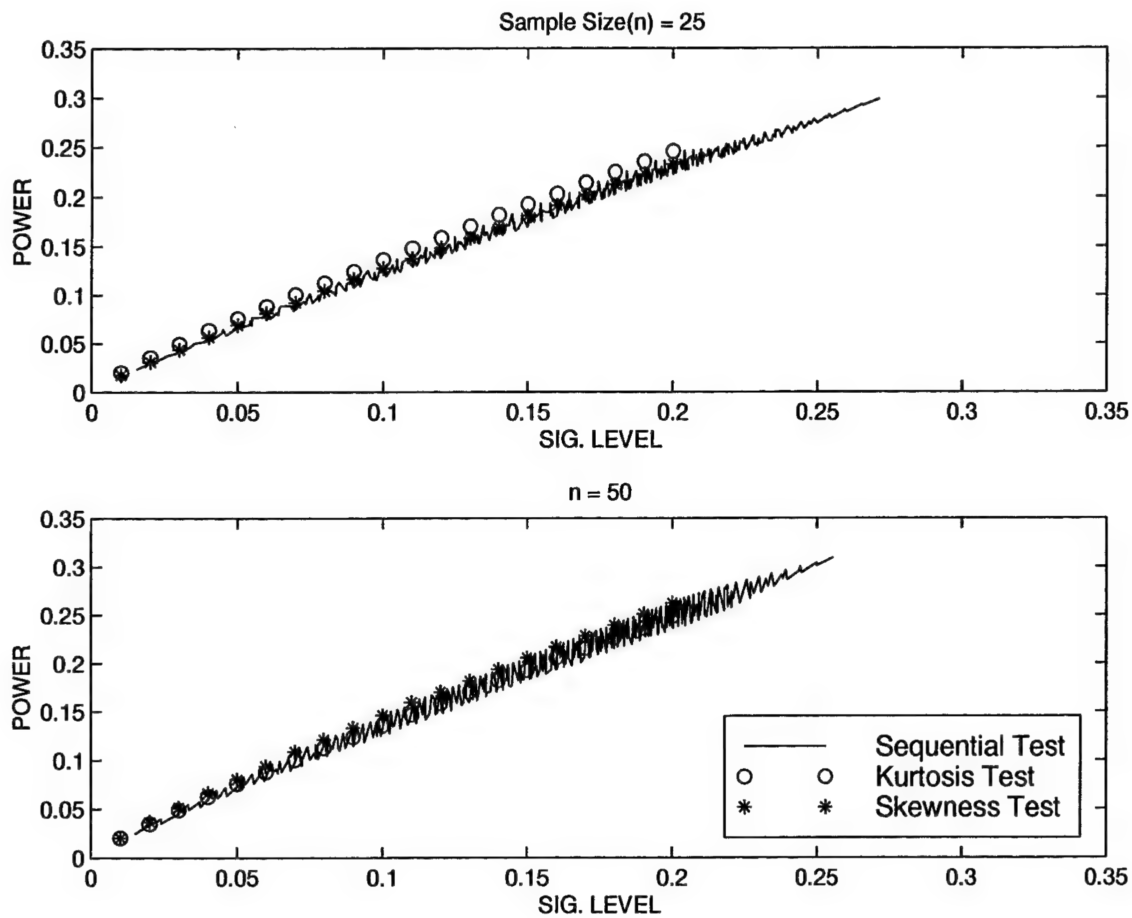


Figure F.52 Power Comparison (SEQ. vs. INDV.) - H_0: Gamma(3.5,1); H_a: Gamma(2,1)

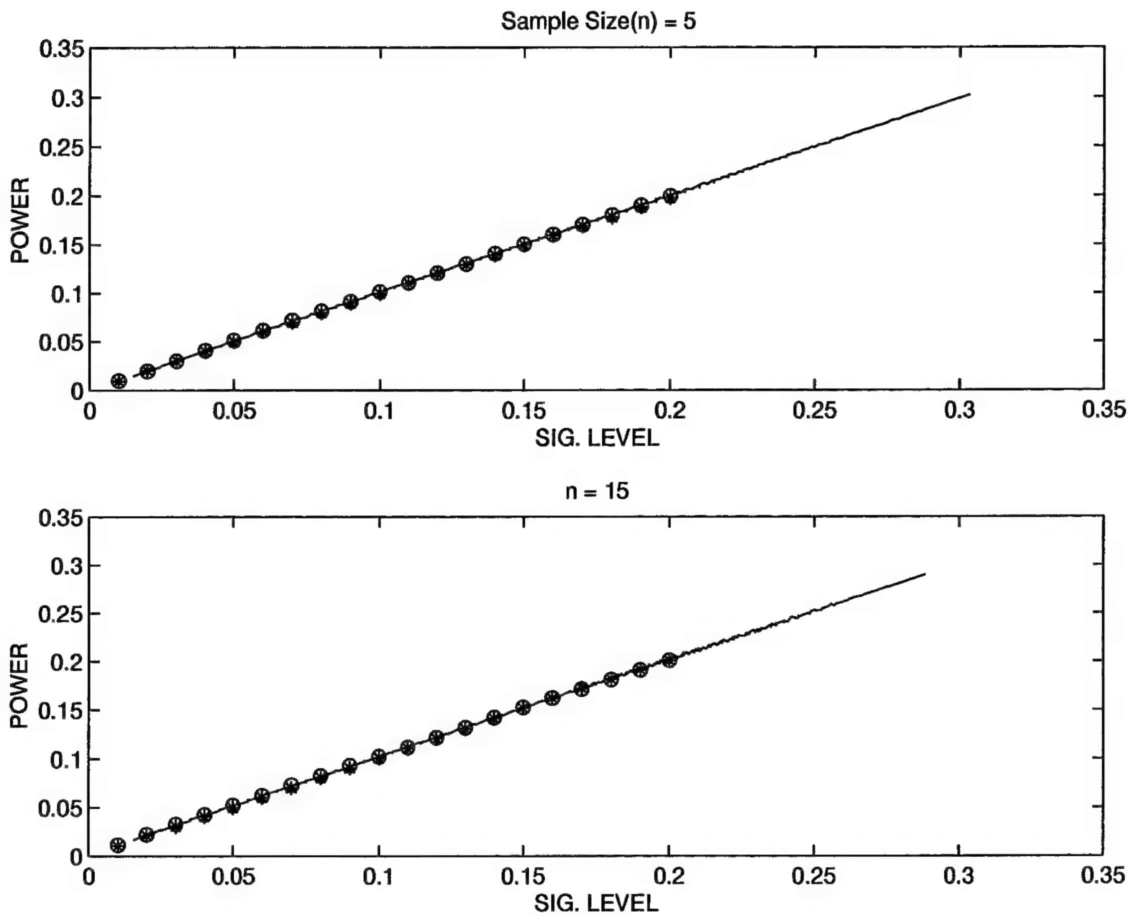


Figure F.53 Power Comparison (SEQ. vs. INDV.): H_0: Gamma(3.5,1); H_a: Gamma(3.5,1)

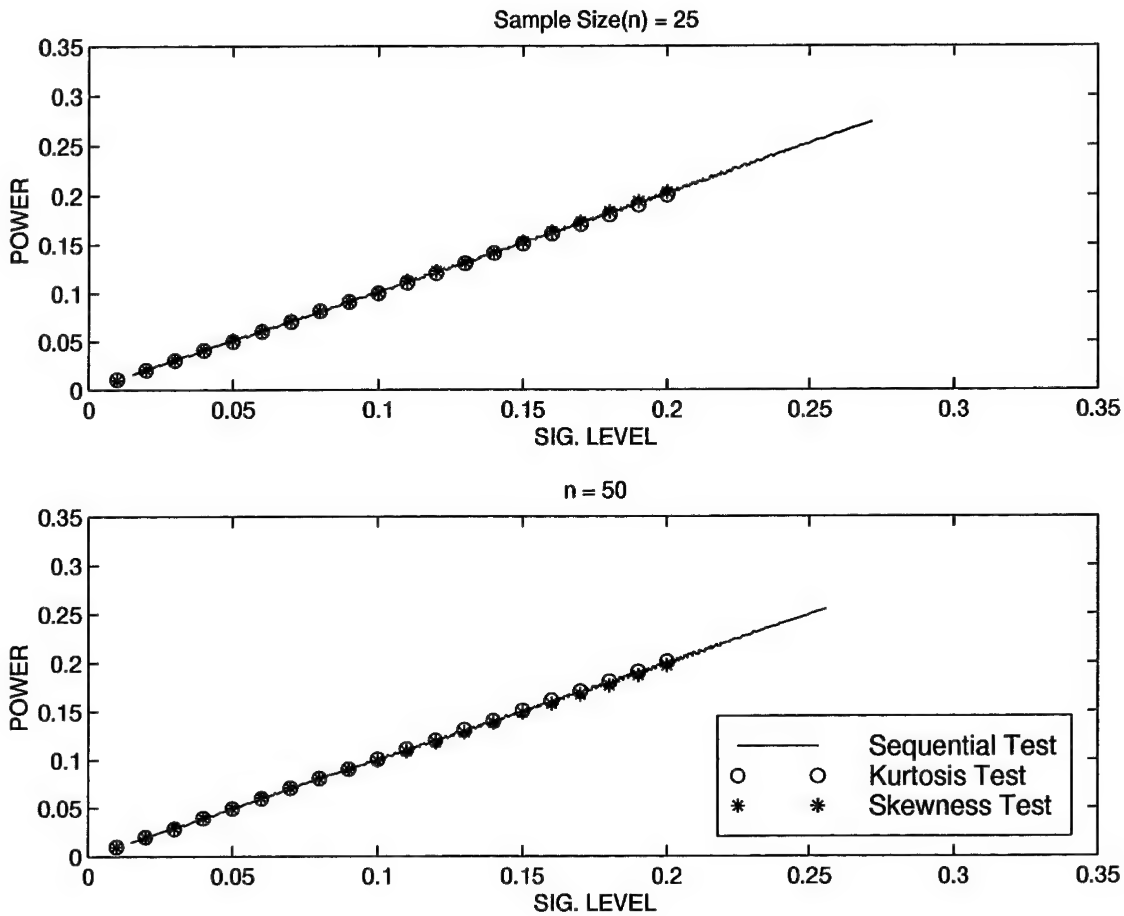


Figure F.54 Power Comparison (SEQ. vs. INDV.): H_0: Gamma(3.5,1); H_a: Gamma(3.5,1)

Appendix G. Individual Skewness and Kurtosis Test Power Results (Two-tailed)

G.1 H_0: Gamma ($\beta = 1$)

G.1.1 Skewness Test Results.

Table G.1 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Uniform(0,2)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.033	0.121	0.206	0.28	0.345
15	0.355	0.632	0.765	0.834	0.878
25	0.742	0.924	0.966	0.982	0.989
50	0.997	1	1	1	1

Table G.2 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Norm(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.031	0.133	0.226	0.291	0.348
15	0.385	0.601	0.709	0.77	0.812
25	0.678	0.839	0.898	0.926	0.943
50	0.959	0.986	0.993	0.996	0.997

Table G.3 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Lognorm(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.019	0.074	0.136	0.19	0.242
15	0.059	0.136	0.204	0.262	0.318
25	0.085	0.176	0.259	0.323	0.378
50	0.134	0.27	0.371	0.443	0.499

Table G.4 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: $\chi^2(1)$

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.029	0.09	0.15	0.205	0.256
15	0.027	0.087	0.143	0.2	0.251
25	0.031	0.095	0.162	0.223	0.279
50	0.032	0.111	0.193	0.264	0.324

Table G.5 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Weibull(2,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.015	0.076	0.145	0.2	0.253
15	0.112	0.268	0.383	0.463	0.53
25	0.226	0.447	0.572	0.65	0.703
50	0.537	0.745	0.826	0.872	0.899

Table G.6 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: XLogistic(0,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.124	0.22	0.292	0.347	0.395
15	0.307	0.428	0.506	0.571	0.629
25	0.418	0.577	0.673	0.732	0.774
50	0.641	0.81	0.879	0.913	0.934

Table G.7 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Gamma(3.5)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.012	0.064	0.123	0.176	0.225
15	0.057	0.158	0.247	0.32	0.382
25	0.099	0.236	0.338	0.412	0.471
50	0.211	0.389	0.496	0.571	0.624

Table G.8 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Gamma(2,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.011	0.053	0.107	0.157	0.203
15	0.024	0.088	0.157	0.216	0.276
25	0.037	0.12	0.197	0.26	0.316
50	0.069	0.175	0.261	0.332	0.389

Table G.9 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Gamma(1,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.01	0.05	0.101	0.151	0.2
15	0.01	0.049	0.098	0.148	0.201
25	0.01	0.05	0.102	0.153	0.2
50	0.01	0.05	0.101	0.15	0.199

Table G.10 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: $\chi^2(4)$

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.011	0.053	0.107	0.157	0.203
15	0.024	0.088	0.157	0.216	0.276
25	0.037	0.12	0.197	0.26	0.316
50	0.069	0.175	0.261	0.332	0.389

Table G.11 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: XCauchy(0,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.343	0.418	0.474	0.516	0.549
15	0.691	0.754	0.794	0.829	0.854
25	0.822	0.89	0.913	0.926	0.933
50	0.918	0.93	0.933	0.933	0.934

Table G.12 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Beta(2,3)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.019	0.089	0.163	0.224	0.28
15	0.185	0.406	0.549	0.638	0.707
25	0.427	0.706	0.824	0.881	0.914
50	0.909	0.981	0.993	0.997	0.998

Table G.13 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Beta(2,2)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.026	0.119	0.211	0.28	0.342
15	0.36	0.631	0.76	0.827	0.872
25	0.742	0.919	0.964	0.98	0.988
50	0.996	1	1	1	1

Table G.14 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Xdouble - Exp.

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.096	0.183	0.254	0.312	0.362
15	0.286	0.402	0.479	0.541	0.598
25	0.4	0.55	0.644	0.701	0.741
50	0.625	0.789	0.857	0.894	0.916

G.1.2 Kurtosis Test Results.

Table G.15 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Unif0rm(0,2)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.007	0.038	0.08	0.125	0.169
15	0.051	0.218	0.377	0.498	0.593
25	0.274	0.63	0.814	0.896	0.938
50	0.959	0.998	1	1	1

Table G.16 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Norm(0,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.003	0.018	0.043	0.071	0.103
15	0.003	0.027	0.067	0.114	0.165
25	0.009	0.064	0.155	0.25	0.339
50	0.073	0.321	0.519	0.645	0.732

Table G.17 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Lognorm(0,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.02	0.077	0.14	0.197	0.249
15	0.057	0.133	0.199	0.254	0.306
25	0.081	0.164	0.237	0.3	0.355
50	0.117	0.237	0.331	0.4	0.454

Table G.18 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: $\chi^2(1)$

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.035	0.109	0.182	0.245	0.301
15	0.028	0.091	0.149	0.203	0.254
25	0.029	0.091	0.152	0.207	0.263
50	0.028	0.092	0.163	0.224	0.279

Table G.19 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Weibull(2,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.003	0.022	0.051	0.085	0.12
15	0.005	0.039	0.092	0.151	0.209
25	0.016	0.095	0.205	0.304	0.39
50	0.11	0.345	0.501	0.603	0.668

Table G.20 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: XLogistic(0,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.129	0.234	0.314	0.374	0.426
15	0.298	0.41	0.48	0.531	0.575
25	0.394	0.515	0.605	0.671	0.717
50	0.564	0.734	0.819	0.86	0.889

Table G.21 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Gamma(3.5)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.004	0.023	0.054	0.09	0.127
15	0.005	0.033	0.077	0.127	0.178
25	0.01	0.058	0.133	0.201	0.267
50	0.041	0.158	0.26	0.337	0.402

Table G.22 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Gamma(2,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.006	0.031	0.066	0.106	0.147
15	0.006	0.038	0.084	0.134	0.184
25	0.01	0.053	0.116	0.175	0.231
50	0.024	0.094	0.165	0.227	0.283

Table G.23 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Gamma(1,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.011	0.052	0.102	0.151	0.201
15	0.009	0.049	0.1	0.15	0.2
25	0.01	0.049	0.099	0.152	0.204
50	0.01	0.05	0.101	0.15	0.198

Table G.24 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: $\chi^2(4)$

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.006	0.031	0.066	0.106	0.147
15	0.006	0.038	0.084	0.134	0.184
25	0.01	0.053	0.116	0.175	0.231
50	0.024	0.094	0.165	0.227	0.283

Table G.25 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: XCauchy(0,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.342	0.419	0.476	0.519	0.554
15	0.679	0.735	0.768	0.793	0.813
25	0.795	0.842	0.883	0.9	0.91
50	0.887	0.905	0.91	0.912	0.913

Table G.26 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Beta(2,3)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.004	0.023	0.052	0.087	0.124
15	0.009	0.065	0.145	0.225	0.303
25	0.04	0.195	0.38	0.519	0.627
50	0.373	0.764	0.895	0.946	0.969

Table G.27 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Beta(2,2)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.004	0.023	0.053	0.088	0.125
15	0.012	0.081	0.18	0.277	0.363
25	0.061	0.284	0.507	0.656	0.759
50	0.599	0.93	0.983	0.994	0.998

Table G.28 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Xdouble - Exp.

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.095	0.18	0.249	0.305	0.354
15	0.277	0.385	0.453	0.503	0.548
25	0.379	0.495	0.583	0.648	0.693
50	0.552	0.719	0.802	0.846	0.875

G.2 H_0: Gamma ($\beta = 3.5$)

G.2.1 Skewness Test Results.

Table G.29 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: Uniform(0,2)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.018	0.071	0.124	0.176	0.225
15	0.057	0.2	0.326	0.422	0.502
25	0.158	0.422	0.584	0.681	0.754
50	0.586	0.853	0.933	0.965	0.979

Table G.30 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: Norm(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.016	0.071	0.132	0.193	0.246
15	0.115	0.258	0.364	0.442	0.505
25	0.242	0.45	0.563	0.636	0.688
50	0.555	0.754	0.833	0.875	0.902

Table G.31 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: Weibull(2,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.01	0.05	0.097	0.147	0.196
15	0.013	0.058	0.112	0.164	0.216
25	0.018	0.079	0.142	0.199	0.256
50	0.033	0.123	0.209	0.281	0.346

Table G.32 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: Gamma(3.5,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.009	0.05	0.1	0.149	0.198
15	0.011	0.05	0.101	0.152	0.201
25	0.01	0.051	0.101	0.153	0.203
50	0.01	0.05	0.099	0.149	0.197

Table G.33 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: Gamma(2,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.011	0.057	0.108	0.158	0.207
15	0.015	0.06	0.113	0.166	0.218
25	0.018	0.069	0.127	0.181	0.233
50	0.02	0.08	0.146	0.205	0.262

Table G.34 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: Gamma(1,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.025	0.089	0.148	0.201	0.249
15	0.044	0.126	0.207	0.277	0.337
25	0.057	0.169	0.265	0.342	0.407
50	0.089	0.248	0.377	0.471	0.545

Table G.35 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: Beta(2,3)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.01	0.051	0.098	0.144	0.194
15	0.02	0.09	0.167	0.234	0.295
25	0.041	0.166	0.274	0.363	0.44
50	0.153	0.409	0.572	0.676	0.75

Table G.36 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: Beta(2,2)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.012	0.064	0.119	0.172	0.226
15	0.063	0.206	0.331	0.426	0.502
25	0.162	0.428	0.587	0.684	0.753
50	0.582	0.851	0.931	0.963	0.978

Table G.37 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: XCauchy(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.401	0.491	0.543	0.583	0.613
15	0.783	0.863	0.891	0.909	0.92
25	0.916	0.945	0.953	0.956	0.959
50	0.934	0.935	0.935	0.935	0.935

Table G.38 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: Lognormal(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.051	0.141	0.214	0.275	0.325
15	0.169	0.309	0.415	0.49	0.549
25	0.261	0.456	0.572	0.644	0.698
50	0.458	0.691	0.795	0.85	0.886

Table G.39 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: $\chi^2(1)$

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.072	0.174	0.247	0.305	0.353
15	0.122	0.269	0.386	0.475	0.545
25	0.17	0.382	0.518	0.612	0.679
50	0.284	0.577	0.731	0.812	0.863

Table G.40 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: $\chi^2(4)$

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.011	0.057	0.108	0.158	0.207
15	0.015	0.06	0.113	0.166	0.218
25	0.018	0.069	0.127	0.181	0.233
50	0.02	0.08	0.146	0.205	0.262

Table G.41 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: XLogistic(0,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.202	0.326	0.402	0.456	0.498
15	0.488	0.662	0.755	0.806	0.843
25	0.689	0.849	0.909	0.938	0.955
50	0.924	0.98	0.992	0.995	0.997

Table G.42 Power Study: Skewness Test - H_0: Gamma(3.5,1); H_a: Xdouble - Exp.

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.157	0.268	0.341	0.397	0.443
15	0.451	0.614	0.698	0.752	0.79
25	0.657	0.81	0.872	0.903	0.924
50	0.904	0.968	0.984	0.99	0.993

G.2.2 Kurtosis Test Results.

Table G.43 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Uniform(0,2)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.014	0.064	0.122	0.178	0.232
15	0.061	0.201	0.314	0.403	0.473
25	0.195	0.446	0.604	0.695	0.763
50	0.707	0.919	0.97	0.987	0.993

Table G.44 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Norm(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.006	0.035	0.076	0.116	0.16
15	0.004	0.025	0.054	0.088	0.124
25	0.005	0.026	0.059	0.092	0.13
50	0.007	0.041	0.093	0.147	0.207

Table G.45 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Weibull(2,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.008	0.046	0.09	0.137	0.184
15	0.008	0.039	0.082	0.127	0.173
25	0.009	0.044	0.095	0.144	0.193
50	0.016	0.071	0.138	0.199	0.258

Table G.46 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Gamma(3.5,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.01	0.051	0.101	0.15	0.2
15	0.011	0.052	0.102	0.152	0.201
25	0.011	0.05	0.1	0.151	0.201
50	0.01	0.049	0.101	0.151	0.201

Table G.47 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Gamma(2,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.014	0.065	0.121	0.177	0.23
15	0.019	0.074	0.134	0.19	0.245
25	0.02	0.075	0.136	0.193	0.246
50	0.02	0.076	0.135	0.193	0.248

Table G.48 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Gamma(1,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.03	0.108	0.178	0.241	0.298
15	0.043	0.123	0.198	0.266	0.325
25	0.047	0.137	0.22	0.285	0.343
50	0.06	0.165	0.259	0.331	0.398

Table G.49 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Beta(2,3)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.008	0.043	0.089	0.136	0.182
15	0.011	0.059	0.112	0.163	0.213
25	0.023	0.094	0.177	0.251	0.32
50	0.078	0.266	0.427	0.539	0.633

Table G.50 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Beta(2,2)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.009	0.043	0.086	0.132	0.179
15	0.015	0.073	0.14	0.2	0.258
25	0.036	0.145	0.259	0.352	0.433
50	0.168	0.461	0.659	0.775	0.847

Table G.51 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: XCauchy(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.398	0.493	0.552	0.595	0.63
15	0.752	0.809	0.847	0.875	0.89
25	0.872	0.916	0.93	0.937	0.94
50	0.911	0.915	0.915	0.915	0.915

Table G.52 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Lognormal(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.053	0.156	0.236	0.304	0.362
15	0.152	0.268	0.354	0.425	0.488
25	0.207	0.364	0.468	0.538	0.597
50	0.342	0.543	0.652	0.72	0.767

Table G.53 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: $\chi^2(1)$

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.08	0.198	0.286	0.356	0.413
15	0.106	0.219	0.304	0.379	0.445
25	0.124	0.27	0.381	0.46	0.522
50	0.169	0.369	0.505	0.594	0.661

Table G.54 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: $\chi^2(4)$

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.014	0.065	0.121	0.177	0.23
15	0.019	0.074	0.134	0.19	0.245
25	0.02	0.075	0.136	0.193	0.246
50	0.02	0.076	0.135	0.193	0.248

Table G.55 Power Study: Kurtosis Test - H_0: Gamma(3.5); H_a: XLogistic(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.204	0.338	0.423	0.483	0.532
15	0.445	0.567	0.649	0.717	0.761
25	0.583	0.746	0.82	0.863	0.891
50	0.83	0.931	0.962	0.975	0.982

Table G.56 Power Study: Kurtosis Test - H_0: Gamma(3.5,1); H_a: Xdouble -Exp.

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.156	0.272	0.349	0.41	0.461
15	0.417	0.536	0.615	0.681	0.725
25	0.561	0.721	0.794	0.836	0.866
50	0.815	0.918	0.952	0.967	0.976

Appendix H. Individual One-Tailed Test Power Results

H.1 H_0: Gamma ($\beta = 1$)

H.1.1 Lower Tail Skewness Test Results.

Table H.1 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Normal(0,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.061	0.222	0.337	0.435	0.518
15	0.471	0.708	0.812	0.866	0.9
25	0.753	0.898	0.943	0.964	0.976
50	0.973	0.993	0.997	0.999	0.999

Table H.2 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Weibull(2,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.031	0.135	0.229	0.312	0.39
15	0.164	0.382	0.527	0.625	0.695
25	0.314	0.571	0.702	0.779	0.832
50	0.622	0.826	0.899	0.934	0.954

Table H.3 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Gamma(3.5,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.024	0.109	0.189	0.267	0.335
15	0.088	0.24	0.362	0.451	0.523
25	0.146	0.334	0.459	0.548	0.616
50	0.276	0.494	0.618	0.692	0.749

H.1.2 Upper Tail Skewness Test Results.

Table H.4 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: Lognorm(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.026	0.096	0.165	0.227	0.285
15	0.08	0.183	0.273	0.347	0.412
25	0.111	0.244	0.348	0.43	0.499
50	0.179	0.366	0.486	0.571	0.638

Table H.5 Power Study: Skewness Test - H_0: Gamma(1,1); H_a: XLogistic(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.153	0.275	0.358	0.424	0.478
15	0.349	0.504	0.623	0.699	0.755
25	0.474	0.672	0.773	0.832	0.874
50	0.712	0.879	0.934	0.958	0.972

H.1.3 Lower Tail Kurtosis Test Results.

Table H.6 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Normal(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.005	0.035	0.078	0.129	0.183
15	0.008	0.067	0.164	0.271	0.385
25	0.02	0.155	0.338	0.495	0.62
50	0.142	0.519	0.732	0.842	0.902

Table H.7 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Uniform(0,2)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.013	0.07	0.143	0.216	0.287
15	0.097	0.377	0.593	0.732	0.829
25	0.403	0.814	0.938	0.974	0.988
50	0.986	1	1	1	1

Table H.8 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Gamma(3.5,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.007	0.039	0.086	0.137	0.192
15	0.01	0.068	0.153	0.239	0.329
25	0.02	0.126	0.248	0.352	0.44
50	0.074	0.256	0.391	0.493	0.57

H.1.4 Upper Tail Kurtosis Test Results.

Table H.9 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: Lognorm(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.026	0.095	0.162	0.224	0.279
15	0.077	0.175	0.256	0.325	0.389
25	0.105	0.221	0.32	0.398	0.465
50	0.156	0.325	0.439	0.524	0.593

Table H.10 Power Study: Kurtosis Test - H_0: Gamma(1,1); H_a: XLogistic(0,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.151	0.27	0.35	0.412	0.462
15	0.336	0.474	0.562	0.634	0.701
25	0.439	0.603	0.713	0.775	0.822
50	0.633	0.819	0.889	0.924	0.947

H.2 H_0: Gamma ($\beta = 3.5$)

H.2.1 Lower Tail Skewness Test Results.

Table H.11 Power Study: Skewness Test - H_0: Gamma(3.5); H_a: Beta(2,3)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.017	0.075	0.145	0.213	0.279
15	0.038	0.166	0.291	0.394	0.484
25	0.077	0.274	0.439	0.562	0.655
50	0.241	0.572	0.75	0.844	0.902

H.2.2 Upper Tail Skewness Test Results.

Table H.12 Power Study: Skewness Test - H_0: Gamma(3.5); H_a: Gamma(1,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.039	0.127	0.205	0.274	0.335
15	0.066	0.202	0.324	0.422	0.501
25	0.09	0.263	0.402	0.508	0.596
50	0.14	0.376	0.544	0.656	0.738

Table H.13 Power Study: Skewness Test - H_0: Gamma(3.5); H_a: Gamma(2,1)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.016	0.07	0.131	0.188	0.243
15	0.024	0.093	0.171	0.244	0.307
25	0.029	0.111	0.195	0.273	0.342
50	0.036	0.137	0.238	0.324	0.405

H.2.3 Lower Tail Kurtosis Test Results.

Table H.14 Power Study: Kurtosis Test - H_0: Gamma(3.5); H_a: Beta(2,2)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.012	0.061	0.124	0.183	0.241
15	0.03	0.139	0.256	0.357	0.449
25	0.065	0.259	0.433	0.571	0.678
50	0.266	0.659	0.847	0.926	0.963

Table H.15 Power Study: Kurtosis Test - H_0: Gamma(3.5); H_a: Uniform(0,2)

Sample Size	Significance Level				
	0.01	0.05	0.10	0.15	0.20
5	0.021	0.09	0.165	0.234	0.297
15	0.103	0.314	0.472	0.588	0.674
25	0.282	0.604	0.763	0.853	0.906
50	0.81	0.97	0.993	0.998	0.999

H.2.4 Upper Tail Kurtosis Test Results.

Table H.16 Power Study: Kurtosis Test - H_0: Gamma(3.5); H_a: Gamma(1,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.037	0.115	0.183	0.241	0.293
15	0.057	0.159	0.256	0.334	0.402
25	0.068	0.198	0.302	0.392	0.464
50	0.091	0.252	0.384	0.484	0.566

Table H.17 Power Study: Kurtosis Test - H_0: Gamma(3.5); H_a: Gamma(2,1)

Sample Size	Significance Level 0.01	0.05	0.10	0.15	0.20
5	0.015	0.066	0.123	0.176	0.226
15	0.023	0.084	0.152	0.212	0.269
25	0.026	0.094	0.167	0.234	0.295
50	0.028	0.107	0.191	0.264	0.331

Appendix I. Matlab Program

I.1 Critical Values

```
% Initialize values for 3-parameter Gamma
theta = 1; % (scale)
beta = 1; % (shape)
delta = 0; % (location)

% Convert to a and b parameters used by gamrnd function
a = beta;
b = theta;

numsamples = 100000; % Number of trials

for n = 5:5:50
sprintf('Starting sample size n = %d\n',n)
skew = zeros(1,numsamples); % Preallocate the vectors
kurt = zeros(1,numsamples);

for i = 1:numsamples
x = gamrnd(a,b,1,n)+delta;
sk = skewness(x);
kt = kurtosis(x);
skew(i) = skewness(x);
kurt(i) = kurtosis(x);
if rem(i,1000) == 0 disp(i);end
end

disp('finished generating')

% Sort the arrays in ascending order
skew = sort(skew);
kurt = sort(kurt);
disp('sorted')

% For the given sample size n, find upper and lower tail critical values
% Step through alpha=0.005(0.005)0.10 and 0.10(0.10)0.20.

alpha = 0.005;
step = 0.005;

while alpha < 0.21
if alpha <= 0.10
j = round(alpha*200);
else
j = round((alpha+0.10)*100);
```

```
end % if

i = round(n/5); % Find row index for critvals arrays

skewuptail( i,j)=prctile(skew, (1-alpha)*100); % Employ percentile
skewlotail( i,j)=prctile(skew, alpha*100); % function to find
kurtuptail( i,j)=prctile(kurt, (1-alpha)*100); % upper and low
kurtlotail( i,j)=prctile(kurt, alpha*100); % crivals

if alpha >= 0.10
step = 0.01; % change the step after 0.10
end % if
alpha = alpha + step; % Increment alpha for the next level
end % while
sprintf('Done with sample size %d\n' ,n)
end % for
% End of loops

disp('Saving and writing to files')

save skewcrit skewuptail skewlotail; % Save the critvals to
save kurtcrit kurtuptail kurtlotail; % binary files

format ='%2d %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f
%4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f %4.3f
%4.3f\n';

col = (5:5:50); % vector to keep track of sample sizes in output

% Send tables to 4 files (upper/lower skewness/kurtosis)

table = [col',skewuptail];
file1 = fopen('skewup.txt','w');
fprintf(file1, 'Critical Values for Skewness - Upper Tail \n');
fprintf(file1, 'Shape = %d\n', beta);
fprintf(file1, '\n');
fprintf(file1, format, table');
fclose(file1);

table = [col',skewlotail];
file2 = fopen('skewlo.txt','w');
fprintf(file2, 'Critical Values for Skewness - Lower Tail \n');
fprintf(file2, 'Shape = %d\n', beta);
fprintf(file2, '\n');
fprintf(file2, format, table');
fclose (file2);
```

```
table = [col',kurtuptail];
file3 = fopen('kurtup.txt','w');
fprintf(file3, 'Critical Values for Kurtosis - Upper Tail \n');
fprintf(file3, 'Shape = %d\n', beta);
fprintf(file3, '\n');
fprintf(file3, format, table');
fclose (file3);

table = [col', kurtlotail];
file4 = fopen('kurtlo.txt','w');
fprintf(file4, 'Critical Values for Kurtosis - Lower Tail \n');
fprintf(file4, 'Shape = %d\n', beta);
fprintf(file4, '\n');
fprintf(file4, format, table');
fclose (file4);
```

I.2 Attained Significance Levels

```
% Initialize values for 3-parameter Gamma
theta = 1; % (scale)
beta = 1; % (shape)
delta = 0; % (location)

% Convert to a and b parameters used by gamrnd function
a = beta;
b = theta;

% Number of trials of size n to generate
numsamples = 100000;

% This will load
% kurtlotail kurtuptail
% skewlotail skewuptail
load kurtcrits1;
load skewcrits1;

A = zeros(20,20,10); % Initialize the counter array to all 0s

for n = 5:5:50
sprintf('Starting sample size %d',n)

for i = 1:numsamples
x = gamrnd(a,b,1,n)+delta; % Generates a 1xn vector of Gamma deviates
sk = skewness(x);
kt = kurtosis(x);
if rem(i,1000) == 0 disp(i); end

% Initialize the placeholders for this particular sample
icurr = 1 ; jcurr = 1 ;
istop = 21; jstop = 21;

% Conduct the Skewness Test (Test #1) at all alpha levels until
% we find a failure, then save that point in istop.
% We'll use alpha levels from 0.01 to 0.20. The corresponding
% critvals for the two sided test are alpha/2 and 1-(alpha/2)
% and correspond to columns 1 to 20 respectively in the upper and
% lower tail arrays loaded earlier. Columns 21-30 in these arrays

% conduct the skewness Test (Test #1)
while icurr < istop
if sk < skewlotail(n/5,icurr)
istop = icurr;
elseif sk > skewuptail(n/5,icurr)
istop = icurr;
```

```
end

icurr = icurr + 1; % Increment icurr if passed or failed
end % while

% If it failed, the resetting of istop
% will force loop termination
% When the while loop ends, istop will
% equal the failure point (1-20) or
% equal 21 if it passed all levels.

% Now conduct the Kurtosis Test (Test #2) similarly
while jcurr < jstop
if kt < kurtlotail(n/5,jcurr)
jstop = jcurr;
elseif kt > kurtuptail(n/5,jcurr)
jstop = jcurr;
end

jcurr = jcurr + 1;
end % for while

% At this point jstop will hold the
% fail point (1-20) if it failed;
% If it passed all, then jstop = 21

% Now figure out which cells to increment in the counter array.
% Fail is an array of 0s and is indicating what levels the
% sample failed Test #1; Fail2 is the similar array for Test #2.
% The Inc array is the union of the two and will be used to increment
% the main count array A.

Fail1 = zeros(20,20); % Initialize them to all 0s
Fail2 = zeros(20,20);
Inc = zeros(20,20);

if istop < 21 Fail1(istop:20,:) = 1; end % Fill in 1s where failed
if jstop < 21 Fail2(:,jstop:20) = 1; end % unless failed none

Inc = Fail1 | Fail2;
A(:,:,n/5) = A(:,:,n/5) + Inc;
end % for loop (i)-go back for next sample of size n
sprintf('Finished sample size %d- going to next. \n',n);
end % for loop (n) - now change sample sizes

% Now A has counts for all sample sizes (5:5:50)
A = A./numsamples; % Divide by numsamples to get alpha levels
```

```
% Now output to a file
save sigtable1 A; % Save A to a binary file for future use
file1 = fopen('sigtable1.txt','w'); % And save to a text file

format ='%4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f &
%4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f\\\\ \\hline \n';

fprintf(file1,'Table for Shape = %d \n',beta);
for n=5:5:50
fprintf(file1,'Significance Levels for sample size %2d \n',n);
fprintf(file1,format,A(:,:,n/5)');
fprintf(file1,'\n \n');
end % for

fclose(file1);
disp('Done: File saved.')
```

I.3 Power Study of the Sequential Test

```
% Parameters for the alternate distribution [Chi-squared(1)]
% a = 0.5;
% b = 1 ;
v = 1

numsamples = 40000; % Number of trials of size n to generate


load kurtcrit; % Load the critical values arrays generated for
load skewcrit;


% H0:Gamma(1,1) from the critvals simulation.
% load
% kurtlotail kurtuptail
% skewlotail skewuptail


A = zeros(20,20,10); % Initialize the counter array to all 0s


n = 5 ; % 1st Sample size
step = 10; % Start with a step of 10 to do 5,15, and 25


while n < 51 % Cycle until you step past sample size 50


sprintf('Starting sample size %d',n)


for i = 1:numsamples
x =chi2rnd(v,1,n);
sk = skewness(x);
kt = kurtosis(x);
if rem(i,1000) == 0 disp(i); end


% Initialize the placeholders for this particular sample
icurr = 1; jcurr = 1;
istop = 21; jstop = 21;


% Conduct the Skewness Test (Test #1) at all alpha levels until
% we find a failure, then save that point in istop.
% We'll use alpha levels from 0.01 to 0.20. The corresponding
% crit values for the two sided test are alpha/2 and 1-(alpha/2)
% and correspond to columns 1 to 20 respectively in the upper and
% lower tail arrays loaded earlier. Columns 21-30 in these arrays
% are not needed at this time


% concuct the skewness Test (Test #1)
while icurr < istop
if sk < skewlotail(n/5,icurr)
istop = icurr;
elseif sk > skewuptail(n/5,icurr)
```

```
istop = icurr;
end % if

icurr = icurr + 1; % Increment icurr if passed or failed
end % while

% If it failed, the resetting of istop
% will force loop termination
% When the while loop ends, istop will
% equal the failure point (1-20) or
% equal 21 if it passed all levels.

% Now conduct the Kurtosis Test (Test #2) similarly
while jcurr < jstop
if kt < kurtlotail(n/5,jcurr)
jstop = jcurr;
elseif kt > kurtuptail(n/5,jcurr)
jstop = jcurr;
end
jcurr = jcurr + 1;
end % while

% At this point jstop will hold the
% fail point (1-20) if it failed;
% If it passed all, then jstop = 21

% Now figure out which cells to increment in the counter array.
% Fail is an array of 0s and is indicating what levels the
% sample failed Test #1; Fail2 is the similar array for Test #2.
% The Inc array is the union of the two and will be used to increment
% the main count array A.

Fail1 = zeros(20,20); % Initialize them to all 0s
Fail2 = zeros(20,20);
Inc = zeros(20,20);

if istop < 21 Fail1(istop:20,:) = 1; end % Fill in 1s where failed
if jstop < 21 Fail2(:,jstop:20) = 1; end % unless failed none

Inc = Fail1 | Fail2;
A(:,:,n/5) = A(:,:,n/5) + Inc;
end % for loop (i)-go back for next sample of size n
sprintf('Finished sample size %d- going to next. \n',n);

if n==25 % Once you hit size 25, jump to 50 on the next iteration
step=25;
end % if
n = n + step; % increment n for the next sample size
```

```
end % while loop (n) – now change sample sizes

% Now A has counts for all sample sizes (5:5:50)
A = A./numsamples; % Divide by numsamples to get alpha levels

% Now output to a file
save pwrchi21 A; % Save A to a binary file
file1 = fopen('pwrchi21.txt','w'); % And save to a text file
cols=[0.01:0.01:0.2]; % labels for leftmost column

format ='& %3.2f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f &
%4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f\\\\
\\cline2-22 \n';

heading = ' & 0.01 & 0.02 & 0.03 & 0.04 & 0.05 & 0.06 & 0.07 & 0.08 & 0.09 & 0.10 & 0.11 & 0.12
& 0.13 & 0.14 & 0.15 & 0.16 & 0.17 & 0.18 & 0.19 & 0.20 \\\\ \\hline \\hline \n';

fprintf(file1,'Power Study: H0: Gamma(0.5,1) H1: Chi-squared(1) \n');
for n=5:5:50
fprintf(file1,'Powers for sample size %2d \n',n);
fprintf(file1,heading);
table=[cols',A(:,:,n/5)];
fprintf(file1,format,table');
fprintf(file1,'\n \n');
end
fclose(file1);
disp('Done: File saved.')
```

I.4 Power Study of Individual One-tailed Test (Lower Tail Skewness Test)

```
% Parameters for the alternate distribution [Weibull(0,2)]
a=1;
b=2;

numsamples = 40000;

load skewcrit;

A = zeros(10,20);

% Initialize the failure counter array to all 0s
% 1st index (rows) tracks sample sizes (5:5:50)
% 2nd index (cols) tracks alpha levels (.01:.01:.20)

n = 5;
step = 10; % Start with a step of 10 to do 5,15, and 25

while n < 51 % Cycle until you step past sample size 50

sprintf('Starting sample size %d',n)

for i = 1:numsamples
x =weibrnd(a,b,1,n); % Generates a 1xn vector
sk = skewness(x); if rem(i,1000) == 0 disp(i); end % Helps me see progress

% Initialize the placeholders for this particular sample
jcurr = 1;
jstop = 21;
jindex = 0;

% To assign a proper critval
% in the case of one-tailed test
% critval designed for two sided tests
% was converted to one -sided test by this array
% For the one tailed test we want the actual .01*i
% critval, so we must change the reference.

% concuct the Skewness Test (1-tailed)
while jcurr < jstop
if jcurr <=10
jindex = jcurr*2;
else
jindex = jcurr + 10;
end; % if
```

```
if sk < skewlotail(n/5,jindex)
jstop = jcurr;
end % if

jcurr = jcurr + 1; % Increment icurr if passed or failed

end % while

% At this point jstop willl hold the fail point (1-20) if it failed;
%If it passed all then jstop = 21.

% Now figure out which cells to increment in the counter array.
% Fail is an array of 0s and is indicating what levels the
% sample failed Test #1; Fail2 is the similar array for Test #2.
% The Inc array is the union of the two and will be used to increment
% the main count array A.

Fail = zeros(1,20); % Initialize them to all 0s

if jstop < 21 Fail(1,jstop:20) = 1; end

% Fill in 1s where failed
% unless failed none

A(n/5,:) = A(n/5,:) + Fail;

end % for loop (i)-go back for next sample of size n

sprintf('Finished sample size %d- going to next. \n',n);

if n==25 % Once you hit size 25, jump to 50 on the next iteration
step=25;
end % if

n = n + step; % increment n for the next sample size

end % while loop (n) - now change sample sizes

% Now A has counts for all sample sizes (5:5:50)
A = A./numsamples; % Divide by numsamples to get alpha levels

% Now output to a file
save p1tsklowweib A; % Save A to a binary file
file1 = fopen('p1tsklowweib.txt','w'); % And save to a text file
```

```
format =' %2d & %4.3f & %4.3f & %4.3f & %4.3f & %4.3f \\\\ \n';
heading = 'Size & 0.01 & 0.05 & 0.10 & 0.15 & 0.20 \\\\ \\hline \\hline \n';
fprintf(file1,'Power Study: Lower Tail Skewness Test -H0: Gamma(1,1) H1: Weibull(1,2) \n');

fprintf(file1,heading);

for n=5:5:50
row=[n,A(n/5,[1 5 10 15 20])];
fprintf(file1,format,row);
fprintf(file1,'\n \n');
end % for

fclose(file1);
disp('Done: File saved.')
```

I.5 Plots for Critical Values

```
% Critical Value Plot Script 'M' files
% Sour Data Critical Value (Skewness and Kurtosis) from Matlab

load skewcrit % load skewness (kurtosis) value for each shape parameters
load kurtcrit % for three-parameter Gamma Distribution

x=5:5:50;

subplot(2,1,1);
plot(x, skewlotail(:, 2),'b', x,skewlotail(:, 20),'g.', x, skewlotail(:, 30),'r*',x, skewuptail(:, 2),'bo',
x,skewuptail(:, 20),'gx', x, skewuptail(:, 30),'r+',x, skewlotail(:, 2),'b',x,skewlotail(:, 20),'g',x, skewlotail(:,
30),'r',x, skewuptail(:, 2),'b',x,skewuptail(:, 20),'g',x, skewuptail(:, 30),'r');
xlabel('Sample Size (n)');
ylabel('Skewness Value');
title('Skewness Lower and Upper Tail Critical Values of Significance
Level(\alpha)');

subplot(2,1,2); plot(x, kurtlotail(:, 2),'b', x,kurtlotail(:, 20),'g.', x, kurtlotail(:, 30),'r*',x, kurtup-
tail(:, 2),'bo', x,kurtuptail(:, 20),'gx', x, kurtuptail(:, 30),'r+',x, kurtlotail(:, 2),'b',x,kurtlotail(:,
20),'g',x, kurtlotail(:, 30),'r',x, kurtuptail(:, 2),'b',x,kurtuptail(:, 20),'g',x, kurtuptail(:, 30),'r');
xlabel('Sample Size (n)');
ylabel('Kurtosis Value');
title('Kurtosis Lower and Upper Tail Critical Values of Significance Level((\alpha)');
legend('0.01','0.1','0.2','0.99','0.90','0.80',4);
```

I.6 Contour Plots

```
load sigtable; % choose an appropriate file name for each shape

x=0.01:.01:.20; % Labeling the axes
y=x;
v=.01:.01:.30; % Desired contour levels
S10=A(:,:,1); % pick off sample size 5
[s10label, h]=contour(x,y,S10,v);
clabel(s10label,h,'manual');


labels = ['0.01';
          ' ';
          ' ';
          ' ';
          '0.05';
          ' ';
          ' ';
          ' ';
          ' ';
          '0.10';
          ' ';
          ' ';
          ' ';
          ' ';
          '0.15';
          ' ';
          ' ';
          ' ';
          ' ';
          '0.20';];

set(gca,'XTick',x) % Adjust the x-axis tick marks
set(gca,'YTick',y)
set(gca,'XTickLabel',labels)
set(gca,'YTickLabel',labels)
title('Attained \alpha-Levels');
grid;
xlabel('\alpha-level of Kurtosis Test');
ylabel('\alpha-level of Skewness Test');
```

I.7 Power Comparison Plots

```
% Power Plot Ho: Gamma (shape, scale) Ha: Alternative Dist.(parameter)
% Compare the power of the sequential test with the two-sided tests

%——————————————————Sample Size 5——————————————————

subplot(2,1,1)
load sigtable;
Level= A(:,:,1); % Load the significance levels of the sample size 5
clear A;
load pwrbeta22;
Power = A(:,:,1); % Load the power for the same sample size
clear A;
Power=Power(:);
Level=Level(:);
[sLevel i] = sort(Level); % Sort the levels and save the indicies to
sPower = Power(i); % sort the corresponding powers pairwise

% Data for the Power for the 2-sided Kurtosis Test

load ../../../indiv/comm/kurt/sh1/ptwoktbeta22;
Kpower = A(1,:); % Adjust 1st index acc to sample size
clear A;
Klevel = .01:.01:.20; % Vector of corresponding sig levels

% Data for the Power for the 2-sided Skewness Test

load ../../../indiv/comm/skew/sh1/pwrtwoskbeta22;
SKpower = A(1,:); % Adjust 1st index acc to sample size
clear A;

plot(sLevel, sPower, Klevel, Kpower,'go', Klevel, SKpower,'r*')
title('Sample Size(n) = 5')
xlabel('SIG. LEVEL')
ylabel('POWER')

%——————————————————Sample Size 15——————————————————

subplot(2,1,2)
load sigtable1;
Level= A(:,:,3); % Load the significance levels of the sample size
clear A;
load pwrbeta22;
Power = A(:,:,3); % Load the power for the same sample size 15
clear A;
Power=Power(:);
Level=Level(:);
```

```
[sLevel i] = sort(Level); % Sort the levels and save the indices to
sPower = Power(i); % sort the corresponding powers pairwise

% Data for the Power for the 2-sided Kurtosis Test

load ../../../indiv/comm/kurt/sh1/ptwoktbeta22;
Kpower = A(3,:); % Adjust 1st index acc to sample size
clear A;
Klevel = .01:.01:.20; % Vector of corresponding sig. levels

% Data for the Power for the 2-sided Skewness Test

load ../../../indiv/comm/skew/sh1/pwrtwoskbeta22;
SKpower = A(3,:); % Adjust 1st index acc to sample size
clear A;

plot(sLevel, sPower, Klevel, Kpower, 'go',Klevel, SKpower,'r*')
title('n = 15')
xlabel('SIG. LEVEL')
ylabel('POWER')
legend('Sequential Test','Kurtosis Test','Skewness Test',4)
```

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Vita

Major Chil Ho Park was born in Kyung-Pook Province, Republic of Korea on 14 March 1966. He graduated from Tae-Gu High School in 1985. He then joined the Republic of Korea Air Force Academy and received a B.S. in English Literature on 1 March 1989. After completing his Flight Training Course, he was assigned to the 1st Combat Flight Wing Center and started his career as a fighter pilot on 7 June 1989. In December 1990 he moved to the 11th Combat Flight Wing Center to receive primary training on the F-4 weapon system. He was married to Hyun Sook Chung on 20 March 1993. During his assignment, he was chosen to be an instructor pilot. After serving four and one-half years, he moved to the 3rd Training Flight Wing Center on May 1995. In June 1997, he entered the Graduate Operations Research program in the School of Engineering, Air Force Institute of Technology, Wright-Patterson AFB, Ohio.

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13. ABSTRACT *(Maximum 200 words)*

This research presents a new sequential goodness of fit test for the three-parameter gamma distribution with a known shape. The test is accomplished by employing two new tests, sample skewness and sample kurtosis, sequentially as test statistics. Unlike the typical goodness of fit test, using parameter estimation methods such as maximum likelihood estimation and minimum distance estimation, this test using the two test statistics above does not involve a substantial degree of computational complexity. Large Monte Carlo simulation has been used to determine critical values and overall significance levels for all combinations of the two tests, and to conduct extensive power studies against a broad range of alternatives. The results have been compared with those of popular EDF tests such as the Anderson-Darling, Cramer-von Mises, and Komogrov-Smirov tests. The comparative study demonstrated the sequential tests superiority over a broad range of alternatives. Hence, with computational efficiency and good power properties, the new sequential test is powerful enough to be utilized in the goodness of fit test field.

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